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N A T U R E and P O W E R S
O F T H E
B A T H S and W A T E R S
O F
B A R E G E S:

I N W H I C H

Their superior Virtues for the Cure of Gun-Shot and other Wounds, with all their Complications of inveterate Ulcers, Fistulas, Callosities, and Caries; likewise of muscular and nervous Contractions, Schirrous Tumours, Anchyloses, and many other Diseases, as well Internal as External; are demonstrated, and confirmed by PRACTICAL OBSERVATIONS.

W I T H

A Descriptive Relation of BAREGES.

T O W H I C H I S A D D E D

An ENQUIRY into the CAUSE of HEAT
I N
B I T U M I N O U S W A T E R S,

A N D O F

Their Specific V A R I A T I O N S.

By Sir CHRISTOPHER MEIGHAN,
Knight of the Noble Order of CHRIST, M. D.
Member of the Royal Academy of Sciences at Roüen.

A NEW EDITION, greatly enlarged.

Aggredior Sacros ausus recludere Fontes.

L O N D O N:

Printed for A. MILLAR, in the Strand.

MDCCLXIV.

THE GREAT

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TO THE
PRESIDENT and FELLOWS
OF THE
Royal College *of* Physicians,
in L O N D O N.

GENTLEMEN,

AN essay on this subject, such as one season's knowledge of *Barrages* could produce, was in 1742 inscribed to the learned Doctors *Mead* and *Wilmot*, members of your illustrious body, as proper judges of its nature, and highly capable of determining whether or no it was worthy of the public attention.

They were pleased to approve of my Essay, deeming it to be of consequence to the welfare of mankind. This excited all my zeal to a further

study of the principles and effects of these admirable waters, and encouraged my adding many essential illustrations, with the practical cases of three successive summers, during which I had the advantage of observing their virtues : so that this may justly be look'd upon as a new work.

Most of the cures I mention are truly remarkable, and of importance enough to give me hopes that I shall not be censured as one, who through the itch of scribbling troubles the world with trifles.

All I can say for myself is, that I am exact and fair in what I offer, and that my only motive is the relief of the distressed, the discharge of my duty towards mankind, and the corresponding obligations of my profession.

If you, Gentlemen, whom so many eminent qualities distinguish amidst
the

DEDICATION. vii

the learned medical societies of *Europe*, dignify my endeavours with your sanction; others, I may hope, will receive them with favour, and then I shall think I have succeeded in all my views: at least I shall be secure of one very flattering point, if you be pleased to accept this public testimony of the perfect and lasting respect, with which I have the honour to be,

GENTLEMEN,

April 23, 1764.

Your most humble

and most obedient Servant,

Christopher Meighan.



ADVERTISEMENT.

THIS Work was ready for the press, at the time the last war between *England* and *France* commenced. It's publication, tho' as necessary, as greatly wished for, was justly postponed ; because it availed little to indicate a remedy, so troublesome for persons of these realms to come at, on account of the difficulty of obtaining passports.

The Author, who resided for many years in foreign parts, left his treatise in this country, for the advantage of which he more particularly designed it; and being now returned, consents to it's publication, at a juncture which appears

x A D V E R T I S E M E N T.

every way opportune, because of that freedom which the happy return of peace allows of repairing to *Bareges*, and of the number of wounded, as well as other diseased persons, who must stand in great need of the extraordinary benefits to be obtained by the use of it's waters.

There are sufficient testimonies of the esteem attending the first Edition of this treatise, which appeared in 1742: Doctor *Hales's* * approbation alone did it great honour in *England*, and in *France* it was well received by many eminent physicians and surgeons: Doctor *Hunauld* †, a celebrated professor, and member of the royal academy of sciences at *Paris*, declared his sentiments in it's favour: Doctor *Bordue*, in his learned *Thesis* on the mineral springs of *Languedoc*, sustained before the faculty of *Paris*, refers to Sir *Christopher Meighan's* experiments and observations, in all he says of these of *Bareges*; and Sir *Salvator Morand*, a

* Vide his letter at the end of this Treatise.

† Vide his letter, *ibid*.

very competent judge of such a performance, honoured it with a *French* translation, which he would have published, had not the Author prevailed on him to wait for a more perfect work.

Therefore, since the Essay which gave the first notion of the general utility of these waters, was so much regarded, and that after a little time none of the printed copies thereof were to be got, at any price, it is presumed that the present performance, every way superior, being amplified with whatever the Author's study, observation, practice, and zeal for the welfare of mankind, were able on this occasion to produce, will give much fuller satisfaction.

This treatise is not composed on the trite plan of many others, which have been written concerning mineral springs: the medicinal part is interesting, and truly consolatory for the distressed, whose cases may induce them to peruse it;

it ; the experiments, many of which are new, and the observations relating to the nature of these waters, appear as rationally convincing, as the evidence of the senses can render them ; the philosophical enquiries, with the explications which occur, are perhaps curious enough to please the lovers of natural knowledge ; and the descriptive relation of the country of *Bareges* may afford some entertainment in its kind.

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T H A T I N T R O -



INTRODUCTION.

AS the subject of Mineral Waters hath long employed the press, and the enquiries of those who study the welfare of mankind, it seems surprising that no satisfactory account hath been yet given to the Public of the nature of those of *Bareges*, which appear to be the most perfect in their kind, and do actually perform more extraordinary cures every season than any other of the medicinal springs and baths of *Europe*.

Without invading the merits of others, so justly prized and celebrated for their salutary virtues, I will prove these assertions by a fair exposition of their principles, and by such observations on numbers of patients from various countries, whom I saw there in 1739, and in three other successive years, as will be sufficient to demonstrate that they answer, in a su-

perior degree, to the most general and important indications in medicine.

The greatest obstructions yield to them; they digest the most inveterate ulcers, external and internal; they penetrate, cleanse, and dispose for reunion the most intricate sinuses, even in the tendinous parts; they exfoliate carious bones, and gently operate the expulsion of extraneous bodies without pain or molestation.

These effects are often beyond the reach of any other powers yet known, but seldom fail of being produced by some months proper use of *Bareges*-waters.

Prejudice, and strange notions of such a mountainous place, are probably the cause why few patients have recourse thither, till their distempers become desperate; yet the number is every summer, of late, so considerable, as to leave no sort of lodging vacant; and I declare, that, within my observation, scarce one in twenty, in cases appropriated, missed an entire cure, or a most promising amendment. If any doubt of this great success, they are referred to persons of credit and rank in this country, who have been witnesses and sharers thereof.

And for a general testimony in favour of these excellent baths, I appeal to the high esteem they maintain amongst the *French*, a conspicuous mark of which is the King's having dignified them with a barrack or hospital for his

his wounded officers, and another for his soldiers, who, when past all other means of cure, are from the remotest parts confidently sent thither, as a last and sure resource.

Their great value to the nation and to the province where they are, is also apparent from the grand undertaking of a coach-road by **Luz*, carried on during a series of years meerly on their account, and at length compleated. It passes along a narrow valley of many leagues in an even course, on the sides of high steep mountains, vast piles of rock having been split, hewn, and removed, to continue it's level, and to gain a sufficient space for it's enlargement; a work perhaps equal to any of the kind done even by the Romans, and which required continual assistance from the government, with the extremest efforts and persevering labours of the people of the country, to compass it.

After much search, I cannot find any authentic memoir of the great antiquity of the use of these waters in medicine: the inhabitants of the place, fond of conferring every dignity on them, carry their fame to a very early date, telling of *Roman* and *Carthaginian* generals cured thereby, with other uncertain traditions not worth recital. It is indeed reasonable to think they were discovered as early as the time that this part of the *Pyrenean*

* A town in this part of the *Pyrenees*.

mountains began to be frequented ; for the singularity of smoke and fumes arising amidst rivulets of snow-water must naturally have led the first passengers to take notice of them : nor is it unlikely that their salutary influence was, by some occasional chance, or trial, soon afterwards perceived ; since in many cases it proves wonderfully sudden, as will appear by examples : but looking back to such uncertainties is altogether needless, since we are perfectly satisfied, by indubitable proofs, of their present utility.

Many historians and travellers, who have written of *France*, mention them as extraordinary baths, but neglect saying any thing more particular in their favour to raise a reader's attention ; which has left them but very imperfectly known in foreign countries. Monsieur **Duclos*, a curious observator, evaporated some bottles thereof, sent to the Royal Academy of Sciences at *Paris*, and he gives a brief account of their extract, being all his operation could afford.

Dr. †*Dessault* of *Bordeaux*, in his dissertation on the stone in the kidneys and bladder, proposes them as an absolute dissolvent ; but zealous for their character in this point only, passes by what would be most serviceable, a detail of their general and well-experienced virtues. I

* Vide Observations sur les eaux minérales de plusieurs provinces de la *France*, Page 72.

† Vide Dissertations de Medicine, tom. 3. contenant une dissertation sur la pierre des reins, et de la vessie.

cannot say so much as he does on that head, having met with no adequate experiment; yet I must conceive a most favourable opinion of their use, in this dreadful malady, considering their *lythontriptic principles, their constant success in the gravel, and in sundry analogous evils, to be hereafter instanced.

The reason perhaps, that no writer has entered into a more ample exposition of their virtues, is because their power of healing sores and ulcers, for which they have been chiefly famed, appeared so plain and conspicuous, as to require no illustration, and that their reputation continually spreading, by reports of remarkable cures, seemed to be in a way of sufficient note. However, it is still necessary to enquire accurately into the nature of a mineral fluid, whose admirable powers in favour of health, are applicable to a variety of disorders, internal as well as external, and to establish a rational knowledge thereof; a point too long neglected, whereby its practice may be improved, and surely conducted by judicious rules.

It is also right to make such a treasure known to the world, for the universal good of mankind; and I do it as a duty which I owe, particularly to my country, while by the cruel rage of war many wounded sufferers need more than ordinary means of relief.

* Capable of breaking or dissolving stones in the bladder and kidneys.

6 INTRODUCTION.

Intent on this alone, I decline what is common in works of this kind; and shall not waste my time in setting forth the general character and encomiums of mineral waters.

It is well known, that the antient Heathens held these salutary gifts of providence in great veneration, as they gratefully dedicated them to their gods; and that the Christians have ever since distinguished them equally, by honouring them with the names of their saints, to whose miraculous influence they have often attributed their virtues.

Their worth is attended to in almost all countries. The *Russians*, *Persians*, *Indians*, *Egyptians*, and *Africans*, frequently seek health in their mineral springs.

Whoever looks into * *Hippocrates*, † *Galen*, *Strabo*, ‡ *Ætius*, or into || *Vitruvius*, § *Seneca*, ¶ *Pliny*, and other writers, will see how much mineral waters were considered by the greatest physicians, and most eminent naturalists, both *Greek* and *Roman*.

But these perquisitions signify very little to the merits of our subject, deriveable only from its proper principles, and relative effects.

* De Aere, loc. et aq.

† De Facult. Sim. l. 10.

‡ Lib. ii. cap. 30.

|| Lib. 8.

§ Lib. 3. Natural. c. 1.

¶ Lib. 31. c. 2.

In pursuit of these, I take natural and medical observations for my guides; which alone can give any certain lights into the true constitutions of mineral waters; for the common experiments, by mixture, shew no clear view of them; and those by fire, lead to deceptions and false hypotheses.

Acids or alkalies raise no sensible effervescence in any fresh-drawn waters I have ever met with; and consequently trials with them appear to me quite fruitless, and productive of no fair discovery in regard to mineral waters.

Acids, indeed, may excite intestine motion in a mineral fluid, which, after resting some time in air, is evaporated, decomposed, and in a manner alkalized; but this is out of the case, as it is not acting with the living source, but with a severed degenerated part of it.

Distillation and evaporation exhibit, 'tis true, the elementary principles of a mixt fluid; yet we are not by them rendered capable of truly determining its properties, since they remain neither in species nor effect the same as before disunion.

A water, for example, which in the fountain had a fresh, tart, sulphureous, or other peculiar taste, comes from the still a burnt or insipid phlegm, destitute of its spirituous parts; and its salt, which in nature's laboratory was of the mild essential kind, becomes harsh and caustic by evaporation, ready to effervesce with

8 INTRODUCTION.

every acid, whereas it was not before susceptible of impression from any.

Whoever considers the difference of all bodies, as well as their effects, to consist in various configurations, cohesions, and dispositions of their component particles, and that a change in these induces the like in them, must be sensible of the fallacies of such analytical trials, and of no comparative inferences being justly to be drawn from them. They shew the power of fire, in dividing and new-modifying bodies; but teach us nothing of their primitive constitution and œconomy, as will be proved, when we come to particulars.

The enquiry annexed to this treatise, concerning the cause of heat in mineral waters, cannot be deemed a vain addition, as it regards an important quality of our subject; and besides that this *phænomenon* is worthy of our curiosity, its examen affords some light into the nature and specific difference of bituminous fountains in general, and consequently may be of utility with regard to their medicinal appropriations.

I decline the affectation of Latin phrases or difficult terms, and use the plainest stile possible. This may encourage the ladies to do this work a favour, which it in a great measure claims at their hands, as they have a double part therein: for, besides their share in the common disorders of life, a train of
others,

others, peculiar to the sex, is to be redressed at *Bareges*; all other remedies having proved ineffectual.

It shall be my particular care to set forth, with that accuracy which is due to truth and experience, the several cases wherein these waters excel, or may prove salutary; hereby to prevent their being misused, as most medicines of note are, by recourse being had to them in all distempers whatever, till many become sufferers, and the credit of a valuable medicine wholly sinks; the victim, as I may say, of too great a reputation.

Some physical writers, through bigotry, or interest, excite such pernicious abuses by extolling a medicine to the skies, and characterising it as universal; but I can have no motive nor bias here, for imposing on my readers by any groundless panegyrics.

It appears likewise material, to direct the proper methods of administering these waters and baths, according to the diversity of cases and constitutions; on which depends both their success and their safety, as of every process in the healing art: for, let vain empirics boast as they will, no universal rule nor remedy can exist. Variety of temperaments and of diseases, even degrees of the same, require the nicest distinction, in order to be rightly proceeded with, and this judicious secret will ever belong to the learned in physic only.

Whoever

10 INTRODUCTION.


Whoever may censure my performance, sure no malevolence can ever invade my intention. I therefore rest satisfied, and have my ends fully answered, if any benefit accrues to mankind by my endeavours, with regard to which I may be permitted to say,

—————*Peragro loca nullius ante
Trita solo; juvat integros accedere fontes:
Atque haurire.*—————

It being thought requisite that I should give some account of the country which possesses the valuable waters I am to treat of; the following short description thereof is here offered to the public.



A
DESCRIPTIVE RELATION
OF
BAREGES.

 HIS pastoral retreat, as I may call it, affords not only the sweets of health, but other pleasures likewise, during the season of the baths, which is from *June* to *October*. Agreeable necessaries of life, and even delicacies of food, are to be found there; the best of company may be enjoyed, and a variety of scenes, amusing and singular present themselves on all sides.

To behold a world of towering mountains piled one on another in a careless noble order, their lofty tops vying, as it were, with the clouds, and adorned with crowns of snow; their verdant sides covered with mingled herds
and

and flocks, while limpid streams run trickling down to rendezvous in every valley; a diversity of murmuring cascades, as sporting nature directs their falls; romantic situations, woods and lakes all around, must surely form a most delightful landskip.

Then to see flowery meadows, corn-fields, roads, numbers of villages, and civilized inhabitants, in a country naturally so wild, displays an admirable view of human industry.

And to contemplate many curious *phænomena*, whose principles are here obvious to the naked eye; as the rise and condensation of vapours; their forming clouds of various hues, and falling again in dew, rain, snow, or hail, is an entertainment truly philosophic.

Hence it might be inferred, that the habitation of *Bareges* is unwholesome and dangerous; but experience shews the contrary: for, though almost all who go thither, be invalids, scarce any die through a series of seasons, or are seized with new disorders in the place; and what entirely proves the good temperature of its air, is a number of phthisical and asthmatic patients who are frequently seen there during three or four successive months, and who feel the joint favour of the climate, with the benefits of the waters. Such happiness in a spot surrounded by mountains, the natural seat of fogs and variable weather, may be accounted for by considering the situation.

The

The valley of *Bareges* lies in a part of the *Pyrenees* annexed to the county of *Bigorre*, on the west side of a mountain named *Traumallet*, which terminates the beautiful valley of *Campan*, after its progress of three leagues from the pretty town of *Bagnieres*, long known by its mineral fountains.

This mountain, cross whose summit passes the old road to *Bareges*, has a steep ascent from the east of two leagues, and stretches three leagues westward, by a descent all very gradual, except the first half league.

On each side, this descent is mostly attended by parallel mountains to it's end, at the town of * *Luz*, where another very lofty one rises in a cross line ; but as it does not close in with the other two, leaves an opening to the left, and one to the right, which is the course of the new road, by *Argilles* and *Lourde*, into the delightful plain of *Tarbe*.

The village of the Baths stands somewhat higher than the middle of this declivity, and therefore it's situation is really very high, tho' it appears to lie in a valley.

In this view of the place we perceive the particular causes of the purity and wholesomeness of its air ; for as the declivity promotes the retreat of gross exhalations, so its height opposes their noxious invasion from below ; and the surrounding mountains, far from being a

* Distant from *Bareges* one league.

disadvantage, serve as friendly screens against the sultry winds and scorching heats, which annoy more open places during summer. I have often observed the good effects of this disposition, but particularly once in passing from *Bareges* over the mountain *Traumallet*. A fine day shone before me to the top, whence I was surprized with a fog so thick and extensive as to prevent my discerning any other object forwards.

Having stopped at this contrast of sunshine on the one, and darkness on the opposite side of the mountain, and observing that the fog approached no nearer, I descended to it's commencement, which was so precise a point, that placing my guide in it, his back continued dry, while his face was washed by a small rain, the gradual increase of which I felt, as I proceeded to within half a league of the bottom ; and there, by another exact division of atmospheres, I suddenly returned to light and fair weather, under a sort of canopy, formed by the impending vapours.

In this much may appear extraordinary, to those who have not been accustomed to mountainous climes ; and truly, such scenes of elementary variety are to be admired, tho' easily conceived, as exhalations rise and fall according to their lightness and gravity.

But my intention is to instance, in the confinement of this fog by the *Traumallet*, the advantage resulting from such barrier-mountains

tains to the situation of *Bareges*, where the same fine day continued, as at my setting out from it in the morning ; yet, with all those favourable guards, it is not to be thought exempt from a share of changeable weather, which is the necessary order of nature, and to which every place, at times, is subject.

It is observed, in this mountainous region, that each vale has its proper wind, according to the point it lies open to. And another remark is, that lightning seldom or never falls here ; probably because the explosive impulse bears towards the more lax and yielding air of the plains.

To give an account of the Village, of the Baths, I must confess the houses are not extraordinary : however, being commodiously distributed, with simple necessities, they answer all the ends of lodgings, especially in the fine season ; and the great demand for them, with the frequent competitions in obtaining them, raise their value so as to give them a high estimation. It may be truly said, they are in taste agreeable to the romantic appearance of the place ; and being decorated with splendid company, as they are in summer, may be fancied like the rural seats of the illustrious shepherds of antiquity.

Here, as in most vallies of the country, a torrent rolls its limpid waters, imparting amusement to the ear, as well as to the eye, by its murmurs, and variety of meanders.

Grants

Grants were made to those, who first went into the *Pyrenees*, entitling them to the freehold of all the tracts of land they could cultivate: nor was less due to their vast pains, who converted rugged precipices into arable land, and, like the laborious * *Israelites* in *Palestine*, bestowed fertility on barren rocks.

The districts of this country are numbered by vallies, as if decrees of order had been received from the mountains; and accordingly the people of each have some peculiar manners and customs, with prejudices against each other: so universal is the infection of party-spirit.

The natives are in general tall, well made, and very light-footed: the men have, in proportion, better faces than the women, which doubtless happens, because their equal labours affect and alter more the tender sex.

Their cloathing is of a strong frize, which they manufacture at home: the women wear veils, jackets, and petticoats; the men, wide breeches, which reach above their hips, short waistcoats, and round caps, some knit, but mostly of frize. Their summer shoes are made of woven packthread; the soles close and thick, the upper part like a net, with two cords to twine and tie about the ancle, in the manner of buskins.

* Vide Maundrell's Journey from Aleppo to Jerusalem, pag. 65 and 66.

This dress is mighty well suited to their work and exercises: the wide breeches permit them to stride and leap with freedom; and their light shoes, being pliable to the foot, with rough soles, facilitate their running up and down the mountains, where their cattle feeding all the summer, they repair thither mornings and evenings for the milk, which is very conveniently carried to their sheds in calves-skins, prepared, and kept perfectly sweet, for that purpose; as wooden, or other solid vessels, would be cumbersome, and more subject to accidents.

Their honesty merits notice and commendation; for there are few or no instances of a traveller's being attacked on the road, or of a stranger's losing any thing of value at the Baths; tho' the wildness of the country, and its proximity to *Spain*, offer refuge and fair encouragement to rogues.

They know no great vice, as they have no inordinate desires; and even the imputation of a crime is so odious among them, that a suspected member is persecuted by public contempt, till he finds himself obliged to quit their society: a fine example of natural morality still subsisting.

They are very jealous of their respective rights and privileges, and all active in behalf of their communities, or little republics, as I may call them. Whatever interests the public weal, is deliberated upon in a general
C council,

council, and agreed to with unanimity ; self-love and patriotism acting as one and the same sentiment in the breasts of these wise, tho' illiterate statesmen.

If any intrusion be made on their territories, as it often happens, by the neighbouring *Spaniards*, they instantly prove soldiers, and shew no less expertness than bravery ; for they shoot mighty well, being accustomed to carry guns, in defence of their flocks against wolves ; tho' they have great dependance on the guard of their dogs, which are large, and fierce as lions, and keep their cattle, with a seemingly rational care, within assigned bounds.

Providence, it might be thought, influences the minds of the *Pyrennean* inhabitants, in loving their mountains to such a degree, that scarce one of them can be engaged to live elsewhere ; and far from envying the rich abodes of the plains, they behold them with pity and contempt. The true cause is liberty, that fair Inducer and most contenting bliss of man : for every person among them is lord of himself, and of his little estate, paying only some yearly tribute to the King of *France*, according to the number of sheep, beeves, and horses, which he maintains at will, on the sides of the mountains round his valley ; the pasture, as well as the woods of all the uncultivated parts, being common in each district.

Doctor *Dessault's* story, that an heiress of this country, who becomes a wife, is treated with
the

the ceremony of dining alone, and being attended by her family, is a mistake : but it is true, that a girl as well as a boy, if the first born, succeeds mostly to the parent's fortune, there being such small portions for younger children, as reduces them to become servants, and they generally chuse to live as such with the inheriting sister or brother : this political maxim, without partiality to sex, occurred to these people, as necessary to prevent the dwindling away of small estates, which must follow from many divisions.

Husbandry is here in as great perfection, as the nature of the place can admit of, and depends much on the judicious management of water, dealt in due time and measure to the lands, by means of little channels, which during the nipping colds convey warm springs, and during the scorching heats, snow-water for their refreshment and sustenance : thus many mountain-sides look ever beautiful and rich, as if overspread with green velvet ; and the meadows thereon are rendered so fertile, as in a season to afford three crops of hay, very nourishing, and particularly wholesome : for cattle in this country, are seldom or never subject to epidemic diseases ; which may be attributed to the great mixture of aromatic herbs, and the grass having a strong impregnation of nitrous salt.

Forage being the chief product of this country, herds and flocks are the principal

commodities, by vending which, the inhabitants procure from those of the plain, corn and whatever else they need: but truly, they covet little more than a necessary supply of bread; for, strangers to all appetites but those of nature, they find in that, with their excellent milk and cream, besides the wild spinage, and other herbs which their soil affords, all the requisites, and I dare say all the sweets, of food.

Most of the diseases I observed among them, are occasioned by sudden transitions from the mild air of their vallies, to the sharp penetrating breezes of the heights, whereby their eyes often suffer disorders, particularly the cataract; or they are infested with worms, an ill consequence indeed of milk, and a vegetable diet, to such as have weak digestions, especially in their youth.

Yet, it must be said, they are generally healthful and long-lived: I saw a man in his eightieth year, who was building a wall, lift large stones with surprising vigour; he was straight, agile, and full of spirits; his complexion was fresh, and his teeth sound and white as ivory, without the care of cleaning them; he never had been blooded, taken any medicines, or known any ailment except a soreness then in his eyes, which though scarce worth complaining of, seemed to him, unacquainted with pain, to be a mighty grievance: he told me, that he never eat flesh-meat nor drank wine but once a year, at the fair of *Luz*. Here

Here is room for wholesome reflections, which might well receive lustre from the life of that old man : but this is not their place, and they might prove useless, if urged in behalf of exploded simplicity.

What provisions those mountains afford are all good in their kind. Besides abundance of milk and cream, which prove an excellent diet with *Bareges*-waters, here is exquisitely fine mutton ; particularly a sort called *Boureague*, brought from the neighbouring Spanish mountains ; numbers of a kind of wild deer, which the inhabitants name *Isard*, whose flesh is very juicy ; also pheasants, *gelinots*, quails, and, what is a rarity, white partridges : moreover, there is an incredible plenty of trouts in many lakes, situated on the tops of mountains, as well as in torrents issuing thence ; and withal, the plain of *Tarbe* supplies every thing desirable, except good wine, which is easily had from **Jurançon*.

It is obvious, that every part of the creation serves to determined and necessary purposes : mountains presenting nought but heaps of snow, communicate the greatest advantages to the world, by shedding perpetual streams, which uniting swell up navigable rivers, whose currents impart wealth, beauty, and fertility to the countries they pass through ; such are the *Garonne*, *Dour*, and *Gave* ; all which take rise in the neighbourhood of *Bareges* : the latter

*A place near the city of *Pau* in *Bearn*, famous for its wines.

flows from a cascade, at *Gaverney*, well worthy of notice ; it falls from a rocky summit loaded with snow, whose semicircular rugged front, like the interior of a ruined amphitheatre, serves to break the descending streams in a variety of ways, and when the solar beams therein display their colours in the form of a rainbow, the scene proves truly admirable: nor is this all the curiosity, for the flood below running in separate rivulets, and forming different angles, produces the most singular effects ; numberless cells, vaulted apartments, and well-arched bridges, subsisting probably ever since the deluge, in a tract of snow many feet high, which lies constantly in the valley under shade.

Other mountains naked and in appearance contemptible, as many in this region seem to be, furnish metallic treasures. Stores of marble and beauteous crystal, of which I have some large pieces, detached from a rock near *Bareges*, which in cut and polish equal the curious works of art ; and here it occurs to mention the *Asbestos*, well known by its use among the old *Romans*, who burnt their dead in bags made thereof : It is found in rocky cliffs, generally associated with the crystal, and shoots in filaments from petrified fibrous roots : whence the crystal likewise rises in clusters, some quite diaphanous, and others with lucid streaks, plainly formed by the *Asbestos*.

Whether there be any specific affinity between them, or that the crystal fluid communicates
only

only by accident with this incombustible substance, enters its predisposed pores, and imparts a similar surface, just as we see kinds of wood, after remaining in certain * lakes, assume the appearance of stone, iron, or copper, tho' they be no more than consubstantiations.

This is a question worthy of some enquiry, as naturalists have not yet well determined, whether the *Asbestos* be a mineral or a vegetable. *A Mineral certainly* It has truly many appearances of the latter, nor does its resisting fire argue the contrary; for an *Indian* wood, whereof the ingenious *Chevalier de Baillou at Florence* gave me a specimen, endures, like it, the fiercest fire without consumption.

The *Pyrennean* people name it † *Lin incombustible*, from a resemblance they attribute to it, when not petrified, with flax: they twist and make it into purses and garters, which they sell to strangers. It would, I think, be convenient for lamp-wicks, and might be found useful for other ‡ purposes.

Having said so much of the rock crystal and *Asbestos*, I should not pass unremarked, a kind of sand found in the same clefts with them. Besides the particularities of it's olive colour, it's impalpable fineness, and it's abounding with many particles of both those substances; the

* As *Loch Neagh*, in *Ireland*.

† Incombustible flax.

‡ Cloths made thereof would be truly beneficial for taking pots off the fire, as they would prove everlasting, and might be readily cleaned by an instant's burning.

24 *A* DESCRIPTIVE RELATION, &c.

result of the following experiment renders it very extraordinary and interesting.

A crucible filled therewith, being kept during six days in fire, the contents assumed the new face and form of a yellow weighty powder, perfectly imitating metallic filings, with a few vitrified lumps like crystal.

Other cares at *Bareges*, and continued travels ever since, have hindered my giving to this matter the further attention, which others may in consequence of this hint.

Considerable, in fine, are the advantages to be observed, in regard of the mountainous parts of the globe. They are the seats of the most flourishing forests, gardens of salutiferous plants, and the sources of the most healing fountains.

To pursue the natural history of this country, would be a work no less curious than interesting; but I have already too long deferred coming to my subject.



P A R T I.

Of the Nature and Powers of Bareges Baths and Waters.

C H A P. I.

Of the Baths and Mineral Fountains.

IN the lower end of the village of *Bareges*, at the foot of the mountain which forms the south side of it's valley, stands a vaulted stone building, which includes the several sources, artfully covered over, and is distributed into apartments for separate baths.

An architect was employed by the King of *France* in the performance of this work; and if it receives the further improvements which may be added, it will perfectly answer all purposes.

It consists of four bathing-rooms; three whereof are in a line, and the other is adjoining,

ing, by way of wing, as the situation of the springs guided the structure.

That which is the * hottest, rises in the middle room, named † *Le Grand Bain*, and flows in such abundance as to supply two lateral pipes, which go one into each of the neighbouring rooms, in order to multiply the number of baths.

In such short passages, the water loses considerably of its primitive heat; for what glides on the right into the ‖ *Petit Bain*, through a pipe which is about five feet long, becomes sensibly cooler; and what runs on the left, into the ¶ *Bain Neuf*, diminishes in proportion, the space being greater.

Moreover, two sources, about blood-warm, flow one in each of these last rooms, and are very properly named ‡ *Les Bains de Delices*, because their temperature is correspondent and quite agreeable to our sensation.

The fourth source in the wing of the building is of later discovery than the rest, and holds a middle degree, between that which is hottest, and those that are luke-warm.

It will be shewn that these various springs contain exactly the same principles; wherefore it seems, as if providence had, by a remarkable care, used ways of diversifying their

* Vide chap. VI.

‖ Little Bath.

‡ The Baths of Delight.

† The great Bath.

¶ New Bath.

heat, in order to present a choice favourable for different constitutions and diseases.

The eruption of these mineral waters is directly up from the bowels of the earth, and they form constant bubbles in rising.

All the fountains are well inclosed within cemented vaults, which keep the spirituous particles safe from dissipation, to be conveyed to their proper outlets, nor can any taint or alteration attend them, as they flow spontaneously and perpetually in the same even manner.

Under the pipes adapted to them stand bathing-tubs, which are readily emptied and cleansed on all occasions; so that every body enjoys the pleasure of pure water, and by means of proper vents, which emit quantities proportioned to those poured in, there is also the agreeable advantage of fresh streams incessantly renewing and imparting their salutary influence, during the time of bathing.

The floors are paved with a marble found in the country, and are kept always washed by the falling waters, which afterwards run into a sewer; whence they are conveyed to form a large horse-bath, wonderfully successful against many * diseases of that useful animal, and are lastly discharged into the neighbouring torrent.

* Horses readily drink this water: I have known some cured by it of the disorder called a broken wind. Contracted stiff sinews, as well as swellings, and ulcerations in their legs, find a certain remedy in it's external application.

C H A P. II.

Trials by Mixture ; with Analitical Experiments, by Evaporation and Distillation, on BAREGES-Waters.

THOUGH these Methods commonly depended on for judging of the principles of mineral waters, be not only imperfect, but often fallacious †, especially, as has been said, in regard of the bituminous kind; yet I give a cursory view, to content those who may have an opinion of such means.

I.

Powdered gall mixed with these waters, had the same effect as when mixed with that of the cold torrent; not the least tincture appeared after standing a whole day. I also tried the infusion of tea, oak leaves, pale roses, and other substances usually employed for the examen of chalybeat springs, all to no effect.

2.

Spirits of vitriol and of nitre, distilled vinegar, lemon-juice, and every acid, failed of moving any degree of effervescence in these waters, fresh from their source.

† Vide Introduction, p. 8.

3.

Fixed salt of tartar, of wormwood, and other alkalies, were employed equally in vain.

4.

The trials made with spirit of hart's-horn, ammoniac salt, and many other volatile alkalies, had no better success than the former.

5.

Syrup of violets communicated no tincture to them, but its own, and such as it gives when mixed with common water.

6.

Nor did the *heliotropium* produce any more than the colour natural to its dissolution.

7.

Blue paper immersed in these mineral waters, undergoes not the least change.

8.

I evaporated two quarts thereof in an earthen pan, over a slow even fire. The pellicle was scarce perceptible; but, as the operation advanced, the sides of the vessel became slightly marked with a grey scurf. When the liquid was reduced to about four spoonfuls, it was of a brown yellow colour, extremely unctuous: it had a mixed taste, partly saline, partly oily, and somewhat sweetish. After perfect evaporation, the bottom of the pan remained thinly incruited with the same sort of matter

matter as on the fides, but darker in colour, very acrid, and hot to the tongue, like worm-wood, or other lixivial salts. The whole quantity was mighty small, in comparifon of the evaporated vehicle, being no more than about $\frac{1}{4700}$.

9.

Two quarts of the fame fluid diftilled by *|| balneum mar.* and as much in *‡ baln. vapor.* the joints having been luted with the greateft exactnefs, afforded only an infipid phlegm, without any mineral character. The little liquid which remained in each ftill was greafy, and of a deep yellow; being further evaporated, the dry matter refembled what resulted from evaporation.

10.

Spirits of falt, of nitre, and all acids, efferved readily with this refidue, but no alkali, fixed or volatile, affected it in the leaft.

|| A water bath.

‡ The vapour bath.

C H A P. III.

Reflections on the foregoing Experiments.

IT is evident that there is no chalybeate particles existing formally in *Bareges-waters*, as galls, and such like substances, produce no streaks of violet or purple, the invariable proofs thereof: and indeed we may be convinced, from a view of all their operations, that no vellicating ingredient joins in their deobstruent powers, though of the utmost penetration and efficacy.

The demonstration is equally strong, that no alkali resides in these fountains; since the influence of every acid is vain, and that neither the *beliotropium*, nor syrup of violets, impart any tincture of green, the known mark of an alkaline nature.

And it is no less obvious how void they are of all acids fixed or volatile, as no alkali induces the smallest effervescence in them; besides that the *beliotropium* and syrup of violets leave no trace of red, the received characteristic of acidity.

From these negatives we then have fair proofs of what is said in our Introduction,

that

that little or no satisfaction accrues from such experiments in the examen of sulphureous waters.

The preceding barely shew, that these of *Bareges* contain neither acid nor alkali; wherefore their genuine salt, as it exists in the source, must be of the neutral kind. And in fact, this opinion corresponds best with their mild nature and operations.

With regard to the alkali found after evaporation and distillation, it is plainly of a new creation, since it had no prior being; nor does it bear any more analogy to the native salt of these waters, than a volatile one, extracted by art from our blood, can claim to that of the circulating mass, which surely none will compare, either in kind or in properties.

There is scarce any matter which may not be changed or new modified by fire; laurel-leaves distilled afford a strong poison; barley and other soft farinaceous substances are converted into burning spirits; rhubarb, a sure purgative, becomes astringent when toasted; nitre which is a cooler, raised to a spirit proves violently hot; and alum by calcination is rendered caustic.

Some will say, that the parts after decomposition, still retain an affinity in virtues with the whole; as the lixivious salt of wormwood, like it's parent-plant, continues stomachic, and that

of the tamarisk and broom, after calcination, remain aperitive and diuretic.

Such a similitude of effects, though it were in some cases verified, can hardly be attributed to any specific connections subsisting after the action of fire; since we see the alteration of all compound bodies a necessary consequence of the disunion of their principles, and how, by the operation of the fire, they are rendered not only essentially different, but oftentimes contraries, in many respects.

We may then justly conclude, that analytical experiments are not the true guides for discovering the constitution and œconomy of mineral waters. Nature is best seen in her own mirror, and to be known by simply tracing and exploring her plain ways.

Non fingendum, aut excogitandum, sed inveniendum quid natura faciat, aut ferat.

C H A P. IV.

Observations by the Senses, conducive to a Knowledge of BAREGES Waters.

THE first object of notice, in approaching these mineral fountains, is their smoke or vapour, which is more or less perceptible, according to the changes of heat and cold in the air.

Our next attention concerns their odour, which very sensibly convinces us of their bituminous impregnation.

Whoever examines, with intent eyes, these waters fresh from the source, perceives on their surface a fine pellucid oil, which vanishes in a very short time.

They are of the utmost clearness; and, be the temper of winds and weather what it will, their limpidity is still the same.

White compact filaments sometimes appear in them, as they flow from the pipes, which quickly subside; and forming a kind of sediment, shall be treated of therewith.

In taste, as well as in smell, they prove truly bituminous; their impression on the palate is refreshing, smooth, and sweetish; not unlike that of genuine fine manna slightly imparted

to

to an aqueous vehicle, without having its maukish quality.

This flavour is not so perceptible in the very hot, as in the tepid springs, whose temperature, agreeable to our sensation, favours best our perception of that æthereal oil and volatile salt, which constitute it, and which cannot be obtained by any method or care in † distillation, they being so ready to exhale, that after the liquid stands half a minute in a glass, it partly loses its delicate, sweet, and milky softness; becoming, in some measure, flat, disagreeable, and harsh.

Their unctuous quality is quite palpable; for they slip between the fingers like oil, and the body immersed therein feels as if it had been rubbed over with a fine pomatum, or cool cream.

The living characters of our waters in their sources being thus considered, we are further to inspect what their decomposition furnishes, in the way of sediment, it being susceptible of the fairest examen.

Their settlement is a grease-like substance, connected by small filaments, which form cells for its reception.

This precious balsam, adapted, as will appear, to the most eminent purposes in topical application, is constantly found wherever they glide or stagnate; some of it sticks in passing

† Vide chap. II.

through the pipes; the bathing tubs are lined with it; and handfuls lie along the sewer leading to the horse-bath.

That remaining in the pipes has a parched white skin, inclosing some viscous matter, of a greyish colour.

What besmears the bathing vessels is entirely soft, partly yellow, partly grey.

And all that gathers in the sink is fibrous, resembling frog's spawn.

These accidental variations are easily explained: for the incrustation of the pipes, affected by continual heat, is thereby dried and hardened; while that in the tubs, often covered and refreshed by the fluid which supplies it, is always moist.

The white filaments observed sometimes swimming in these waters, are either detachments of the incrustations in the pipes, or similar particles brought along from the source; or, perhaps, excrementitious ones, such as are seen cast off from wines, and other depurated liquors.

As the sediment found in the bathing vessels undergoes less alteration than elsewhere, it is the fittest to be examined; and, were it furnished in sufficient quantities, would prove the best of resolvents.

The yellow portion thereof, which is transparent and smooth, like a fine jelly, is plainly a pure bitumen; and the grey part, which

imitates a mucilage or dissolved gum, is doubtless the same, with some gross alloy.

The whole is perfectly unctuous, and bears a resemblance to the soft soap commonly used in *England*.

It appears beyond all doubt, that this *petroleaginous* matter is the true impregnating principle of *Bareges* waters; which by an infinite degree of elaboration and division, is intimately blended therewith; since they are perfectly limpid while they come from their sources, and deposite it wherever they stand to cool, ceasing then to be mineral.

This sediment, when fresh, has the same smell and taste with the waters; but grown stale, as it quickly does, acquires an ammoniacal scent; so ready is it, like animal substances, to ferment and become volatile.

In this way of following nature, as she unfolds herself to our senses, we advance to some satisfactory views of the genius of these admirable waters, and are thereby enlightened in the course of our farther investigations.

C H A P. V.

*Experiments relative to the foregoing
Observations.*

I.

I Put into a narrow-necked earthen vase as much as it could contain of the hottest *Bareges* water, and stopt it very close; after standing a short while, I found the exterior surface of the vessel grow moist, and soon afterwards perceived the fluid gushing through every pore, so as to form sensible drops.

2

A pint cup filled with water of the same source, named *Le Grand Bain*, being left open to the air during twenty hours, the liquid lost all its bituminous taste and smell, its unctuous quality, and great limpidity: it was diminished in quantity, and decreased in specific lightness; so that there remained no mark of its having been mineral.

This aptitude of a liquid to evaporate and be decomposed, not only shews its extreme volatility, but also the little salt there is to keep the aqueous and oily parts in conjunction; whence the spirits flying off, circulation and mixture cease, the liquor turns cloudy, and the gross particles running into cohesions, weigh
each

each other down, just, by comparison, as we see it in a portion of animal fluid severed from the living mass.

3.

A quart of this mineral water, in its greatest heat, and a like quantity of cold water, from the neighbouring torrent, being put into equal vessels, and on the same fire, the latter boiled near a minute sooner than the former.

The surprising result of this experiment sufficiently proves the warmth, which actuates bituminous fountains, to be of a different nature from that communicated by common fire; and consequently the reason of their not being so forward to obey its impulse, is, that the order of motion established in them needs a moment for being subverted and changed, before the igneous ebullition can begin to take place.

4.

The same bath water being heated over a fire, so as to equal the degree of its source exactly, a sip thereof scalded the lips, and was intolerable for deglutition; whereas, coming from the fountain, it may be swallowed in large draughts, like new milk; and, far from parching or offending the most tender palate, it moistens agreeably, and quenches thirst.

Such a difference of the effect caused by the intervention of common fire, serves as well to exemplify its faculty of new modifying bodies, as to make us observe the admirable difference of nature's preparations, and the pe-

culiar œconomy she employs in the constitutions of mineral waters. Their benign warmth, by its plain affinity with that of animal fluids, evinces their appropriation to human welfare.

5.

An earthen pot being filled at the hottest source, and well covered, was placed in a pan filled from the same, which was constantly renewed during twenty-four hours; at the end, the water contained in the pot was found possessed of all its qualities, without any mark of Decomposition; nor had it dropt the least sediment.

Who would have expected, that a liquid so † prone to degenerate and perish, could receive such a prolongation of life? if I may so express myself: but the reason is, that its vital œconomy was seconded and sustained by a homogeneous agent; whence it follows, that the spirit of this fluid, like that which actuates our own, can subsist by nature's impulse and operations only.

6.

A bottle of milk fresh drawn, and left during twenty-four hours in a vase replenished with water of the warmest fountain, continued sweet and pure, as when it came from the animal, without viscosity or change; a preservation very extraordinary and remarkable, but

† Vide experiment 2d.

easy to conceive from the preceding experiment.

7.

A pint of new milk, with as much of the hot bath water mixed therewith, and managed in the like manner, both retained their primitive perfection and freshness.

Nothing can better display the character of these salutary waters, and present a more interesting view of their conformity to our nature, than the analogy we here see between them and milk, the most balsamic of animal juices. They agree in an intercourse of homogenous soft principles, and their union forms a sovereign restorative medicine, as appears by many cases in the second and third parts of this work.

8.

I spread on a leaf of paper some of the sediment of these waters, which exhaled for the most part in a few hours; the little that remained was a filamentous scum, which stuck very fast to the paper; and, being burnt, afforded a strong bituminous scent.

9.

Chance procured me the following experiment, which I relate in all its circumstances.

On my departure from *Bareges*, in the end of September 1739, I filled two square bottles of *Bohemia* glass with the purest sediment, in order to see what observations it might afford, by being kept. Arrived at *Paris* in December, I opened the box wherein these three bottles, with

with many others, full of different liquids, were placed in fit lodges, and I found those alone divided into pieces. My first idea was to attribute this particularity to an explosion, the contained sediment having been fresh, and consequently full of air and spirit when put into the bottles, which were immediately close corked with metal covers screwed thereon. But coming to a nearer examen, I observed all the side and top-pieces thickly covered with a fine unctuous matter, resembling dissolved *sperma ceti*, of a strong ammoniacal smell, and in appearance partly inherent in the glass. On the bottom lay detached a portion of earth without scent or taste, and as nearly as I could guess, equal only to about $\frac{1}{200}$ part of the first contents.

As such a sublimation, if I may call it so, required a space of time for being gradually performed, it was plain that the bottles had not burst by any explosion of air, according to my first notion, and therefore the difficulty still remained concerning the cause.

A very hard frost having continued during my whole journey, and the case which contained the bottles having been constantly exposed to the air; may we not rationally conclude, that a matter so penetrating and ready to exhale, as the refined parts of this sediment, in its pervading the glassy passages, and meeting with a check from the great cold, had burst, and divided them, just as we see it happen in stones, which a frozen pent-up moisture distends and rends to pieces?

Every

Every observation and experiment serves to raise our opinion of the powers of a medicine so balsamic, mild, and exquisitely prepared as these waters appear by their impregnations to be.

C H A P. VI.

The Degrees of Heat and of Gravity in the several Sources of BAREGES Waters, stated and compared.

THE degrees of heat according to *Fahrenheit's Thermometer*, are as follows,

	Degrees of Heat.
The water of the hottest bath, named * <i>Le Grand Bain</i> , is at	111 $\frac{1}{4}$
The water of the † <i>Petit Bain</i> , which is a branch of the former, at ——— ———	110
The water of the ‡ <i>Bain Neuf</i> , likewise a derivation from the <i>Grand Bain</i> , is at ———	109 $\frac{1}{2}$
The water of the temperate baths named <i>les Bains de Delices</i> , at	94 $\frac{1}{4}$

The weight of these mineral waters is determined by a graduated hydrostatical scale, which, in proportion to it's rise or fall in the liquid, measures the difference of gravity.

* Vide Chap. I. of this work.

† Vide ibid.

|| Vide ibid.

‡ Vide ibid.

Degrees of Gravity.

In the hottest called *Le Grand Bain*,
as it issues from the source, the
scale stands at ———

6³

In the same, after remaining a mi-
nute in the air, at —

6²/₃

And after three minutes, at —

6¹/₂

2 lines

In the *Petit Bain*, the scale is at

6¹/₂

2 lines

And after a minute's standing
at ——— ———

6¹/₂

In the *Bain Neuf*, at —

6¹/₂

And after a minute, at —

6¹/₂

less 3 lines

All these waters, after two days
standing, come to the same
weight, which is —

5¹/₂

In the *Bains de Delices*, the scale is
at ——— ———

6

And after six minute's standing at

6 less ²/₈

In the cold torrent water the scale
stands at ——— ———

5¹/₄

In the same boiled, and become
cold at ——— ———

5¹/₂

Here the connection between these degrees
of heat and gravity is very observable; for we
see the decrease of one is regularly attended
with the diminution of the other; and as we
may also remark the extreme quickness with
which the lightness of these bituminous wa-
ters, especially the hottest, together with their
other

other properties, abandons them when separated from the source.

Whether so sudden a degeneracy be owing to their oil and salts running into cohesions, as Dr. *Hales* * thinks, or to their æthereal spirits evaporating and flying off in air, is a question. Experiments and reason lead me to believe, that both causes co-operate in the decomposition of such fluids; and I am humbly of opinion, that the latter is chiefly productive of the change, or vapidness, which in half a minute is perceptible in these of *Bareges*; for their forming gross combinations in so short a space, is scarce to be imagined. However, by their prodigious readiness to evaporate, we have certain demonstrations of the perfect refinement of their principles, and of the necessity of using them at the fountain head; in order to benefit by those precious particles, whose escapes is not, I apprehend, to be restrained by any means whatsoever.

Varnished bottles answering the same end, as *Monsieur de Reaumur*'s † method for preserving eggs fresh, may deserve trial.

* Vide his letter annexed to this work, and his treatise on steel waters.

† Vide Le I Memoire du second volume de son histoire des insectes.

C H A P. VII.

An Exposition of the impregnating Principle of BAREGES Waters.

THESE healing fountains appear no less extraordinary in their nature, than superior in effects to all those we find recorded in the annals of physick.

Every preceding circumstance plainly shews them to be impregnated with bitumen: however, an elucidation of it's species, and a comparative view of the virtues of this balsamic mineral, are illustrations truly requisite.

Hereby not only the genius of our waters is further displayed, but analogical lights may lead us to a more extensive knowledge of the properties of bituminous medicines; and tho' we cannot hope to equal the perfection of nature's preparation, whose exquisite elaboration, infinite division, and intimate mixture, dispose every virtue to action, some happy * Imitation

* Doctor *Hales*, that great improver of useful knowledge, having honoured with a perusal my first reflections on this subject, and considered the results of my * operation with turpentine-oil and spirit of vitriol, has proposed

* Vide Enquiry into the cause of Heat in bituminous waters, at the end of this work.

tion of this salutary fluid may occur, advantageous for the relief of persons whose situations in life permit not their going to *Bareges*.

All bituminous bodies consist essentially of the same elements, fire, acid salt, water, and a refined tenacious earth, which is the inflammable matrix, including and incorporating the rest; so that the diversity observed therein, proceeds only from various proportions of these compounding principles.

When an aqueous *menstruum* abounds, in conjunction with this bituminous earth, they form a *petroleum* or rock oil.

If acid salt be its predominant associate, common sulphur is the result.

And where the terrestrial part prevails, solid bitumens, as amber, coals, or others, are according to it's degrees of grossness produced.

Without ascribing these combinations to original constitutions, it appears, by my *enquiry into the cause of heat in bituminous waters, that the different modifications and species of bitumen, as well as the variations observed in

posed a method of preparing *Bareges* artificial water, which he thinks would prove beneficial in many cases.

At the end of this treatise, I insert the letter he wrote on this occasion, to a gentleman as much revered as known for his great learning, general benevolence, and social virtues. He had my first essay on these waters printed, during my absence from *England*, deeming it important to human welfare.

* Vide the enquiry at the end of this treatise.

such

such fluids, may be effected by subterraneous fires.

My ideas on this matter, though they might with some propriety enter here, are better placed at the end of the work, in order to pursue, without any interruption, what concerns directly the nature and virtues of *Bareges* fountains.

It is sufficiently evident, that the principles wherewith they are enriched, is a genuine *petroleum*; such as comes to us from *Naples* and other places for medicinal purposes.

It is * obvious to sight, on their flowing from the pipes.

It is † felt intimately blended with them, and is, ‡ moreover, conspicuous in their sediment, as it likewise is after § evaporation, by the oily quality and the yellow colour of their *residuum*.

And we are to remark, how truly it is in the order of things, that this bituminous liquid found stagnant and vapid on the surfaces of many tracts of sea, witness about *Portici*, in the neighbourhood of *Naples*, as well as of lakes in *Poland*, || *Russia*, and other countries; because it is cooled by gliding through long

* Vide chap. IV. of this treatise.

† Vide ibidem.

‡ Vide ibidem.

§ Vide chap. II.

|| Vide Anhon. Gab. Rzaczinsk. hist. nat. curios. Polon. p. 119.

spaces of earth, should, in *Bareges* sources, be possessed of all that spirit, activity, and virtue, which motion, division, and warmth can impart.

Doubtless the production is the same: Intervening circumstances account for the accidental difference between them; and accordingly the external use of *Petroleum* may be in some cases beneficially substituted for these waters, where their success directs the application; as I have with satisfaction experienced.

Finally, the analogy between *Bareges*-waters and *Petroleum*, appears by a concurrence of their general properties. *Petroleum* is known to be emollient, penetrating, and discutient; to be efficacious against arthritic, rheumatic, and paralytic diseases; it is also a good vulnerary, very digestive, detergent, and healing; virtues with which these waters are endued to an eminent degree.

This bituminous matter is seen diffused through all parts of the globe.

In *Podolia*, about the city of * *Camineck*, *Petroleum* runs in streams from the rocks, and is depurated by perfumers, to be vended for medicinal purposes.

In the palatinate of *Russia*, the people dig pits to receive distillations of waters, charged

* Vide Anhon. Gab. Rzaczinsk. hist. nat. curios. Polon. p. 119.

with a viscid tar-like* matter, serviceable for greasing wheels, and other machines; it is likewise in vogue against all pestilential diseases.

Near the village of †*Rungury*, a small lake between hills, and others in the mountainous country of *Ropeuka*, are constantly covered with this oily matter. The inhabitants call it *Ropa*. Besides being useful to them in greasing and mollifying leather, they find it a cure for the mange in cattle, as also salutary to themselves against disorders of the stomach, and others.

In all that has been said, we see the plain affinity of the principles of these waters with *Petroleum*, and their sameness of character, which becomes still more manifest as we proceed.

* The same is found at a town, on that account called *Pitchford*, near *Shrewsbury* in *England*.

† Vide Anhon. Gab. Rzaczinsk. hist. nat. curios. Polon. pag. 119.

C H A P. VIII.

*Of the Powers of BAREGES-Waters,
and their Operations on human
Bodies.*

THESE fountains having been hitherto viewed, only with respect to their impregnations, are now to be considered in the nature of their œconomy, as well as of their virtues and faculties.

We are with reason to admire a fluid equal to the most important indications for restoring health, effectual for the most surprising cures, and which transcends all the bituminous waters yet known in practice.

Such advantages in the waters we treat of, must be owing to some very happy particularities ; and many may be deemed concurrent ; as the subterraneous cause of their heat and impregnation, acting in the just degree requisite for their due perfection ; the length of their course before eruption being such, as not to occasion any vapidness or alteration ; the earth through which they glide being free from every matter, which might contribute to a contamination, &c.

For even in Nature's medicinal preparations, as in physical experiments, the least variation in a process, is necessarily productive of a change in the result, and consequently in the qualities and effects thereof.

The powers with which this mineral fluid is enriched, are fitted to operate by mutual influence in each other's favour; the aqueous principle naturally attracting the saline, dissolves, and gives it motion; this, by precipitating the terrestrious particles, purifies the vehicle, and exerts itself in attenuating, and blending therewith the tenacious bitumen, which in it's turn serves to bear up the salt, to keep its parts asunder, and to maintain its regular action; while the heat which animates them to circulation, diffuses spirit, life, and energy through the whole.

By this idea of their composition, we readily conceive how these waters prove so sovereignly penetrating, deobstruent, alterative, balsamic, and healing, as subsequent examples will shew them to be.

Doubtless their salt pervades the minutest vessels, and searches the most intricate recesses of our glands and *viscera*, to break the viscous cohesions, while their assisting balsam, by it's soft influence preventing all conflict and irritation, smooths the ways of circulation and excretion.

Moreover, the aqueous *menstruum* macerates and dissolves the gross concretions, bathes and
opens

opens the habit of the body, serving likewise as a diluting stream to carry off impurities by the several outlets.

And withal, their kindly warmth imparts a favourable glow to infirm nature, which invigorates her functions, and promotes the salutary work of health, without violence or tumult; pernicious consequences entailed on the most part of active medicines.

All this appears so true, that those who continue longest in the proper internal, as well as external use, of *Bareges*-waters, make no complaint of being over-heated, but enjoy an easy flow of spirits; and a constant moisture, which renders their linen remarkably greasy, exhales from their bodies, even for some time after quitting them; such is the aperitive power of this fluid.

Some, at first drinking, may find it distasteful; but after two or three days, there is no more disgust; and large quantities thereof may be taken, without occasioning wind, belching, or the least weight in the stomach; such is its lightness, so gentle its action, and so speedy its passage.

What does not go off by perspiration, is discharged by urine; for this water seldom or never purges, unless so abundantly poured down as to precipitate itself. And this surely adds much to its merit; for purgatives spend their force mostly in scouring the stomach, and bowels; and therefore was *Bareges* water

of that kind, we could not expect its great alterative effects in the minute vessels, and against the most rebellious distempers.

Hence appears the error of those, who are never satisfied if mineral waters be not cathartic, and who frequently violate their virtues, by the addition of some pungent salt; whereas, in all chronical diseases, the true objects of their appropriation, the advantage consists in their circulating with our juices, and working themselves off, according to nature's determination.

It is to be remarked, that mineral waters over-heat bodies according to their principles, and not their degree of warmth; thus we see * *Balleruc* fountains, which are strongly cathartic, cannot well be endured internally or externally, above some limited space of time; while these of *Bareges*, whose actual heat is greater, may be freely applied in every way, during several seasons successively: in like manner, we observe even cold chalybeate springs productive of tumult in the blood, because their asperities assault and fret the solids; very different from the thermal sources I treat of, whose mild balsam gains its way by softening, and gently solliciting the passages.

* They are replete with marine and vitriolic salts, consequently very efficacious in carrying off congestions of gross humours, and afterwards bracing up a constitution; their situation is near the sea port named *Cette*, in the fine country of *Languedoc*.

This is conformable to our common experience, with regard to camphire, oil, sulphur, and such matters, by their combustibility analogous to the *Petroleum* of our waters, all which in their effects prove rather coolers: whereas *Euphorbium*, ginger, pepper, and other acrid substances, though incapable of inflammability, violently heat by their contact, and communicate sure irritation.

There is an advantage belonging to *Bareges* baths, which few or none else of the warm kind can lay claim to, at least in so eminent a degree: the longer they are used judiciously, the greater flow of spirits the patient enjoys; his limbs receive daily increase of suppleness and vigour; all the animal functions are enlivened, and nutrition visibly accrues to the body.

This observation, which is generally confirmed, proves very plainly, that this bituminous fluid, by a spirit similar to that of our nerves, repairs the waste of extraordinary perspiration, and, by an apposition of balsamic particles, repairs with gain the loss occasioned by exhausting sweats.

C H A P. IX.

*Constitutions considered, in regard
to the Use of BAREGES-WATERS.*

IN phyfic, as in other practical sciences, tho' examples justly claim the chief merit, by presenting us with facts, and means of conviction, yet theory, rightly founded, serves as a necessary guide to judicious application; without which, the most important of professions deviates from it's divine purpose, and becomes highly dangerous to human welfare.

To direct the proper use of these valuable waters, and prevent their being misapplied, it is requisite to take a short view of the difference of constitutions, to distinguish in what it consists, and to determine those to which they may prove salutary or noxious.

By the term constitution is to be understood, the state of the most minute fibrous parts of our bodies, with respect to their connections and cohesions between each other, which properly forms the springs of life, and whereon depend all the powers of animal motion and action.

When these cohesions subsist in their regular and due tone, health is at it's full perfection; but any variation that intervenes, being a breach
of

of the œconomy, becomes a disorder in proportion.

The fundry causes which influence human bodies, are capable of discomposing the solids, by over-contracting them, and depriving them of suppleness ; or by over-stretching them, and divesting them of springiness and elasticity.

Both these cases being repugnant to nature, and detrimental to her operations, are sources of various diseases, which may be properly deemed constitutional.

The latter, known by the name of *Atony* or relaxation, is two-fold ; that called primitive, whose principle derives from generation, and where the indisposed system has appeared from the beginning, with ill connected organs, is easily discerned by the flabbiness and atrophy of the parts, by a meagre ghastly countenance, by the inactivity and tottering of the limbs, swellings of the joints, and oftentimes contorsions in the very bones, together with a weak stomach and breast.

The secondary kind is produced by undigested glutinous juices, ill prepared for circulation and nutrition, whereby the vessels, overcharged and distended, lose in time their tone, strength, and elasticity.

It is occasioned by various means ; immoderate food, impeded perspiration, obstructed *menstrua*, neglect of exercise, &c. and is generally to be distinguished by a pale bloated face, by vitiated digestions, mesenteric or other glandular tumors,

I

heaviness

heaviness of the body, want of spirits, numbness, paralytic dispositions, phlegmatic congestions, œdematous swellings, dropsy, and other analogous distempers.

Though these two species of relaxation be much the same in effect, so that a cacochymy or deprivation of the fluids is common to both, yet it is easy and very important here to observe the distinction between them.

In the one, bodies continue languid and disordered from the birth ; but in the other, they are seen to droop, alter, and decay, according to supervening circumstances, and the degeneracy of the humours ; I say their degeneracy, in those vessels and glands, destined by various mechanisms to produce the due preparations and secretions ; for when these fail to any degree in performing their functions, depravations of the fluids proportionably ensue, which are still more dangerous and pernicious, than those derived from a weakness of the stomach, or the other first organs of digestion.

Without enlarging further on a subject, already rendered so sensible to judicious readers, it is only needful for my purpose to remark, that as salutary as *Bareges*-waters appear, for constitutions with rigid contracted fibres, so perilous and destructive they prove to persons, in any degree of a primitive relaxation ; because their principal action being to mollify, the intended remedy becomes an addition to the disease, by promoting a dissolution of the weak fibres.

But

But it is quite otherwise in the secondary kind, where viscid fizy juices choak and overstretch the capillaries ; for the resolute powers of these waters acting on the obstructing matter, liquify and dispell it, whereby the distending cause being removed, it's effect, the relaxation, naturally ceases, unless it's degree be gone so far as to equal that of the primitive sort ; in which case *Bareges*-waters would be alike fatal to the constitution, though perhaps well indicated in some particular respects : but it is, or ought to be, an inviolable law in physic, never to offer a general injury for the sake of a particular advantage.

From what precedes, we have the fair explication of what seems a paradox to many ; how a medicine meerly softening and resolute, can be also capable of conferring strength and elasticity.

These different effects proceed, as we see, from a difference of circumstances ; the agent being invariably the same ; but in one case, it's influence bearing on weak solids, increases their debility, while in another, by melting and thinning the fluids, free motion, circulation, flow of spirits, nutrition, and consequently vigour, are restored to the whole animal system.

Therefore the good effects of medicines are to be obtained, and the evil avoided, only by due discernment and judicious application.



OF THE
EXTERNAL DISEASES,
PARTICULARLY OF
Wounds *and their* Complications,
CURED BY
BAREGES-WATERS;
WITH
PRACTICAL OBSERVATIONS.



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The British Military Noble-
men and Gentlemen.

THE first Observations of this Part of my Work, which regard Gun-shot-Wounds with their Complications, are justly addressed to You, whose Benefit was my first Motive of writing on *Bareges-Bath*. In seeing the Wonders constantly performed by them, in Relief of the Disasters occasioned by War, it was natural to think of indicating such a Remedy to the Military of my Country, who for it's Glory, Honour, and Advantage, have shed their Blood, and signalized their Courage, in every Part of the Globe. That the Distressed may be restored to Health, and long enjoy the Applause and Ac-
know-

knowledgements due to their Conduct, from a most generous and grateful Nation, is the wish of

Their most humble,

and most obedient Servant,

Christopher Meighan.

P A R T



P A R T II.

C H A P. I.

Of External Diseases, particularly of Wounds and their Complications, cured by BAREGES-Waters; with practical Observations.

A History of facts requires only plain narration, as they contain their proofs and authenticity in themselves; and, to leave no room for doubts concerning the veracity and candour of the following cases, I join the names of such persons as it is not improper to mention on the occasion, or whose permission I have obtained. There are many of rank and credit sufficient to give an indisputable sanction to what I advance, and to them I confidently refer myself.

I begin with external disorders, as they are the most obvious to our senses, and most frequently seen at *Bareges*.

Under this denomination I comprehend all those, where-ever situated, that are subject to local application, or susceptible of a direct and immediate contact with medicines: but in treating of these, some distempers, which may be deemed also internal, necessarily interfere; it being impossible to render the distinctions between them always absolute, since they are connected in nature, frequently generate each other, and are often removeable by the same remedies.

The cure of wounds being our leading point, it is to be observed, that those only which require digestion and suppuration; that is, those wherein the divided vessels being unfit for reunion, the stagnating juices ferment, and change into purulent matter; such alone, I say, come properly under the influence of these balsamic waters; which, however, renders their dominion very extensive.

For of this kind necessarily are all wounds inflicted by gun-shot and contusion: Those attended with loss of substance, or with the complications of caries and extraneous bodies, are likewise in the case; as also fistulas, and every sort of ulcer.

Whoever has an idea of the nature of these disorders, and attends to the powers of our waters, must easily conceive their fitness to fulfil the indications of fomenting, softening, and asswaging aggrieved parts; of dissolving, loosening, and removing every impediment to a retrieval

trieval and consolidation of the fibrous structure ; wherein consists the entire plan of healing, as we proceed to shew by authentic proofs in the subsequent cures.

First Practical Observation.

Monfieur Gefferies, of the island of *Martinico*, in the *West Indies*, the first patient I saw at *Bareges*, arrived there in the month of *May* 1739, in a most miserable state. Some years before, he had received a shot in the arm, near the shoulder, and the ball had considerably shattered the anterior part of the *Humerus* bone : whence ensued all the evils to be apprehended in such a case.

Notwithstanding the care of the best surgeons of his country, purulency, sinuses, callosities, and caries, infested the member ; so that little appeared from one articulation to the other, but the black face of a bone, and ulcerations rebellious against all the efforts of art.

In this great distress, having sought these healing waters, he was soon comforted by a hopeful amendment ; for in twenty days time every bad appearance began to change ; and by continuing morning and evening to receive the *Douche* *, or fall of water from the warm-

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est

* The *French* mean by *Douche* the same as the *Latins* do by *Stillicidium* ; a fall of water directed on any part,
to

est source on the afflicted part ; to keep it covered in the intervals with lint and linen dipped therein, and to use at times the temperate bath ; by this simple process the patient obtained a total cure before the expiration of *August*.

To place such surprizing effects in a light of reason, for those who are not much versed in the knowledge of physic, it is requisite to shew the ways whereby the cures of such wounds, and of their complications, are performed.

Though the whole cure be essentially in the hands of nature, as her's alone is the work of regenerating and uniting parts, there is, also, a necessary co-operation required from medicines appropriated to remove the obstacles, and to introduce due dispositions.

Accordingly the fibrous and membranous lacerations must be detached, in order to a fore's being deterged ; the contused collapsed orifices of the vessels are to be animated for producing a laudable digestion, and to be opened for emitting the purulent matter ; every recess of a wound is to be kept clean ; the caries is to be extirpated, by imparting warmth to the osseous substance, and invigorating the arterial vibrations, thereby to sever the tainted scales, and to perfect exfoliation : Finally, the callosities must be dissolved, that the

to produce a more powerful effect by its percussions : it also answers to what in *English* is termed *pumping*.

nutritious

nutritious juice may issue forth, and it's apposition take place.

In considering these several operations, the adequateness of *Bareges*-waters thereto fairly appears; for their balsamic oil and subtle salt form a digestive, surely superior in preparation and virtues to the most esteemed in practice; their kindly heat, so † different from that produced by art, vivifies without inflaming the tender parts, and melts instead of drying the viscous humours, while their aqueous principle, like a refreshing stream, opens the passages, dilutes the stuffing matter, induces free suppuration, and washes every interstice.

Further, we are to attribute great advantages to the manner of applying these waters by the *Douche*, in their flow from the fountain; for as the volume of water, as well as the height of it's fall, may be proportioned to the occasion, due degrees of percussion cannot fail of augmenting it's benefits, by exciting nature to expell all foulness, which saves wounds from the irritation of || wiping, and its pernicious consequences.

It is likewise an important point in favour of this vulnerary fluid, that it glides with ease and safety between such tendons, nerves, and

† Vide chap. V. of this work.

|| Monsieur *De la Pugeade*, a famous surgeon of *Thoulouze*, in dressing wounds, always cleansed them by an embrocation of marsh mallows, or other decoction, without ever wiping.

blood-vessels, as may interpose, to the relief of sores, where no assistance or other medicine can so well be conveyed; and it is for this reason attended with almost constant success in the most desperate cases.

Nor can we doubt but the warm balsamic air of the bath-room, in which wounds are dressed, and the use of soft lint instead of hard tents and pledgets, contribute much to their welfare and cure.

Second Practical Observation.

General *Keith*, universally known for his military merit, was wounded in the siege of *Oxakow*, in the last war between *Russia* and the *Turks*. A ball entering the posterior part of the knee, commonly called the ham, passed between the flexor tendons and the arterial trunk, which in that place lies near the bone. His Excellency was attended for two years by the best surgeons of the *Russian* empire, particularly by Mr *Munsey*, a gentleman of *Scotland*, since raised by his merits to high honour, and to one of the first ranks of his profession.

But their art and endeavours proved abortive; for though they had often brought the wound to close, a stiffness and pain always continued, till it soon broke out again with increased malignity, and became, at length, an obstinate sinuous ulcer, which threatened the
destruction

destruction of the neighbouring articulation.

This perilous state determined the patient to undertake the long journey from *Petersburgh* to *Paris*, in search of further assistance; and on his arrival there, in the beginning of the winter 1738, he, with just confidence, committed himself to the care of Sir *Salvator Morand*, equally illustrious by his science and experience in the healing art.

Messrs. *De la Peronie*, *Guerin*, and *Bouquot*, gentlemen also celebrated for chirurgical knowledge, were called into consultation, and it was agreed, that the duration of the evil was entirely owing to some inclosed foulness, which all the surgeons already employed had not been able to discover.

But the same dangerous obstacles they had met with still subsisted; tendons, nerves, and blood-vessels, rendered it impracticable to open a way by incision; and the intricacy of the sinuous passages prevented the conveyance of any instrument or deterging medicine.

Some time being spent in trials and endeavours to surmount these difficulties, the happy genius of Sir *Salvator Morand* devised the method of passing a seton along the course of the ulcer, and soon afterwards splinters of bone, with scraps of cloth, were extracted, whereby hopes of a cure soon commenced.

To arrive with all possible safety at so great a point, he, knowing the virtues of *Bareges*-waters, proposed them as the most hopeful expedient, and determined his Excellency's going thither, where I had the honour of seeing him during the season 1739, and was a daily witness of the progress of his amendment. The train of complications attending his wound gradually yielded to the operations of bathing, *Douching*, and injecting; the caries, with whatever extraneous matter had remained, were all washed away, the callosities dissolved, and a sound fibrous regeneration filled every sinus, as well as the fistulous ulcer, in the space of three months.

The articulation then began to recover it's due motion and strength, which so readily increased, that in the succeeding winter, at *Paris*, the patient was able to go daily abroad; and the following summer, at *London*, he walked about, scarce using the help of a cane. He even rode during some hours successively without inconvenience or fatigue, though the parts lately injured were particularly distended and tried in that exercise. He soon returned to *Petersburgh* and took the command of the *Russian* Empress's army in the *Ukraine*; proof sufficient of the validity of his cure.

His Excellency afterwards devoted himself to the service of the *Prussian* Monarch, and shared with him the glory of his late memorable campaigns. He died in the battle of
Hochkirchen,

Hochkirchen, lamented and honoured by that illustrious Prince.

Third Practical Observation.

The Right honourable the Earl of *Crawford*, led by his military genius, went a volunteer with the Imperial forces in the last war against the *Turks*: he received a wound at the battle of *Croutzka*, in the year 1739, and such a wound that it is wonderful any man should have survived it, with its cruel consequences.

A ball, presumed by the calibre to have come from a janissary's musket, entered the external superior part of his thigh, near the boney protuberance called the great *Trochanter*, below the hip. It passed through the *Femur*-bone, shattered it for the length of four inches into dispersed splinters, and being doubtless in a state next to fusion, by the great heat, it was, by the resistance it met with, very surprisingly divided into three portions.

One of these remained under the teguments in the place of the fracture; another, forced out of it's line of direction, made way through the anterior muscles of the thigh; and the third, following a direct course, lodged laterally on the *Os Pubis* †, whence it afterwards fell by it's weight into the *Scrotum*.

† A bone which forms the fore part of the *Pelvis* or *Basin*.

In this deplorable situation his Lordship was conducted in a chaise by an affectionate servant to *Belgrade*, distant twenty miles, where Monsieur *Dufrene*, one of the Emperor's surgeons appointed to attend him, dressed his wound, having first sawed off the fractured points of the bone, which had started through it.

The violence of the first symptoms being appeased, he embarked on the *Danube*, and after a tedious passage of near three months, arrived at *Commorne*, where he lay six months enduring repeated incisions, and the most painful trials, for extracting the splinters which had been driven and fixed among the muscles.

The patient proceeded thence to *Vienna*, and consulted the greatest surgeons of the Empire, who sent him to the noted baths of *Baden* in quest of relief, which however it did not afford; for a deep fistulous ulcer remained in the internal part of his thigh, near the insertion of the *Triceps*-muscle, where an incision had been made for the discharge of a collection of purulent matter; and it was accompanied with all the malignant complications imaginable; winding sinuses extended far on all sides; obstinate callosities beset every passage; the bone was greatly cariated, as appeared by rotten particles, which were often discharged; the suppuration was so abundant, that the patient wasted daily, and of so bad a
quality

quality as to create just fears of its corroding the crural artery.

In this desperate state his Lordship's fortitude further enabled him to go to *London* in search of assistance from the skilful of his country, where the most eminent masters, during six months, employed all the resources of art for his cure ; but no remedies could be conveyed through the intricate labyrinths, into those deep recesses which seemed still to contain much foulness ; and it was impracticable to form due apertures, because of the opposing course of the muscles, and the many interspersed blood-vessels.

As a further aggravation of his case, all the muscles on the external side of the thigh having been shortened in consequence of the loss of substance caused by the laceration, and the cauterizing heat of the ball, a flexion of the knee ensued, and through a long want of motion in the joint, the * *Synovial* liquid became so inspissated as to form an † *Anchylosis*.

Such were the distresses of this illustrious patient, when *William Morehead*, Esq; the worthy gentleman already noticed ‡, paid him a visit to exhort him to try the effects of the baths of *Bareges* ; and to inforce his persuasion,

* A grease furnished by glands in the Articulations, to facilitate their motion.

† A disorder wherein the joint is cemented, and incapable of motion.

‡ Vide chap. VII. of this treatise.

presented him with a copy of my first essay on these waters, which, as I have said, he, through a motive of humanity, got printed from a manuscript which I had left in his hands; the product of one season's observation, and consequently very imperfect.

However, his Lordship was thereby moved to make this last experiment for relief, and the King having granted him a ship of war for his safe conveyance to *Bordeaux*, he arrived at *Bareges* in *May* 1742, where I had the honour of seeing him, and of assisting him in the course of his cure.

As the first indications consisted in humecting and mollifying the habit of the body, he began with the temperate baths, which were continued mornings and evenings for many days, each of two hours duration.

The hot *Douche* properly followed next, and was constantly applied to the parts affected immediately after bathing, the softened fibres being then disposed to receive it's most advantageous impressions.

Moreover, the patient regularly drank the mineral waters with equal quantities of milk, whose salutary effects I had already experienced in cases similar to his, and shall duly treat of them in another place.

At the same time the ulcer on the internal side of his thigh, was daily dressed with an ointment of the soapy sediment of the baths, incorporated with crude mercury, which I had

found to be a powerful digestive, and of sovereign efficacy in dissolving callosities.

These means had so happy a success, that we soon perceived a favourable change in his situation; the suppuration became daily more laudable; his hectic fever gradually abated; the flexor tendons of the leg began to stretch, and the articulation of the knee to loosen; so that, in six weeks, his Lordship surprizingly restored to his looks and strength, was capable of applying a great part of the sole of his foot to the ground, and to walk by the help of one crutch together with a cane.

By proceeding in the same methods, these advantages continued to encrease, till the decisive points for his cure were perfectly obtained: the callosities being entirely dissolved, the probe found free entrance into the fistulous ulcer, on all sides; shreds of cloth and particles of mouldered bone issued thence with the suppuration, till in the third month, every sinus being deterged, nature free from impediments, bestowed her nutritious supplies, and the whole was soon filled by a sound fibrous regeneration.

In consequence, he walked about with the aid of a cane only, and had so effectually recovered the strength and freedom of his limbs, that he ascended the rocky steep summit, impracticable otherwise than on foot, of the *Pic de Midy*, a mountain in the neighbourhood of *Bareges*, famous for its height, remarkable on account of its being a chosen observatory with
the

the learned in natural and astronomical studies ; and curious by the view it affords, at times, of a region of subjacent clouds, or, in clear weather, of the inferior mountains, whose crowded tops exhibit the appearance of a level country beneath.

In the month of October his Lordship quitted the baths, with the fairest prospect of an entire cure, which accordingly ensued, though he immediately underwent the fatigue of travelling to *Turin* and *Venice*.

We are here to observe that wounds seldom or never heal till some time after the operation of the *Douche* is ended ; and the obvious reason is, that it's percussions hinder the formation of the tender pellicle, which becomes a cicatrix : but all impediments being removed, and the required dispositions for reunion introduced, nature alone readily concludes that work.

Four years after, I had the honour of passing a month with his Lordship at the camp near *Tournay* in Flanders, and saw his cure was as perfect as possible. The great halt which remained in his walk, proceeded from a shortness of the wounded limb, which had lost four inches in length of the bone ; and was therefore to be properly deemed a defect, notwithstanding which, he was able to bear an active part in the business of the field, where no general officer was on every occasion more alert on horseback : nor did his wounds ever give him any further trouble, than that, after violent
and

and long exercise, the cicatrized skin being very tightly contracted over the bony eminence where the ball entered, it suffered, at times, some slight lacerations, which, after a little repose, easily healed of their own accord.

Some years ago this brave nobleman died, truly a loss to his country, of what disorder my absence from *England* prevented me from learning.

In reflecting on the foregoing case, all that I have advanced concerning the superiour virtues of *Bareges*-waters, appears clearly justified. We see their success when all other means of cure were found impracticable or fruitless: and, in fact, what other medicines do we know capable of penetrating the strong inclosures of the articulations? of melting away the most obstinate concretions, and of removing all the obstacles to such a cure as the present, without molestation, danger, or pain?

Fourth Practical Observation.

Count *De Grunne*, Lieutenant-General, Feldt Marechal in the service of her Imperial Majesty Queen of *Hungary*, was wounded at the battle of *Molowitz* in *Siberia*, in the year 1741.

The ball entering the right side of his belly, close to the anterior *Apophysis* or process of the * *Ilium* bone, passed, as there is reason to be-

* The Haunch bone.

lieve, between the bladder and the || *Rectum*, above their adherence, and lodged in the left side of the loins, under the last false rib.

A violent inflammation of the ‡ *Abdomen*, attended with bloody urine, were the first symptoms, which by due care were removed ; then the suppuration becoming copious, brought out shreds of lace, cloth, and linen, which had been driven into the wound ; and after three months it was perfectly closed : but the patient was nothing the better, since the hostile matter remained, and by its compressing the nerves and muscles, kept his body quite bent, with a total privation of motion in the thigh and leg on the same side.

Moreover, he was cruelly tormented with a constant sharp pain in the crown of his head, the effect, no doubt, of nervous connections and consent of parts.

Thus life hung in suspense, and appeared dependant on the turn the ball might take ; it's fall into the cavity amidst the bowels being the only sad prospect ; for all things examined, no method of redress could be attempted, as the extraneous body was utterly imperceptible to the touch, and the particular spot of it's lodgment could not be determined, because the pains excited by it possessed equally the whole region of the loins, and very often the belly.

|| The straight gut.

‡ The belly.

A friend

A friend of the Count's being luckily at *Bareges*, in the summer of 1742, told me his melancholy situation: Whereupon we joined in sending him an account of the surprizing effects of it's baths in cases like his, and exhorted him to come with confidence to make trial thereof.

Accordingly, by means of a litter, he arrived there from *Vienna*, in the month of *June* the following year, and soon found such relief as made ample amends for the fatigue of his long journey, nay, far surpassed the hopes given him.

The first temperate baths calmed his pains; their continuance mollified, relaxed, and stretched the compressed fibres to such a degree, that in two months he stood erect, and was able to walk with the help of a cane.

It appearing then how greatly the compression of the ball was diminished by the freedom restored to the parts, a hot *Douche* was applied after each temperate bath, in order to excite nature, and to second her efforts towards expelling the extraneous body.

A small pustule was soon perceived under the last false rib, where the ball was suspected to lie. It first emitted a clear serous humour, which increased daily in quantity, till the sore festered, and began to discharge purulent matter, often mixed with blood. Hence I collected hopes of the ball's being in motion, and making way towards the surface; whereupon

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the most powerful digestives, and mollifying cataplasms, composed of the soapy sediment of the waters, with analogous ingredients, were made use of, in order to diminish the external resistance, and to invite it's advance. The baths and *Douches* were likewise continued with all the application that the patient's situation could admit of, thereby to promote the vibrations of the fibres, and augment their propulsive force: Nor did our aim and endeavours prove vain; for, soon after, by his undergoing the motion of a post chair during some hours, the part around the pustule suddenly swelled, inflamed to a violent degree, imposthumated, and quickly breaking, the ball came forth in a stream of matter, to the unspeakable joy of the patient.

Thus rid of the cause of all his disorders, he soon found himself in a condition to travel; for there remained only the simple wound to heal, which required no more than a common dressing; and that was performed by a servant, during his journey to *Paris*, where he arrived in perfect health.

Sir *Salvator Morand*, who holds *Bareges*-waters in the highest esteem, saw his Excellency, and doubtless admired a cure so interesting, and, I may say, worthy of curiosity.

The Count continued his journey to join the *Austrian* army on the *Rhine*, commanded by his Royal Highness Duke *Charles* of *Lorraine*, who was most agreeably surprized, to see a person deemed irrecoverable, and particularly
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dear to him, restored to new life and vigour, able to undergo the toils of war, as I was witness he did during the campaign of *Alsace*.

I cannot in this place omit making grateful mention of the high honour and advantage this nobleman procured me, in the favour and protection of that most gracious Prince, whose bounty and generosity equal his other eminent virtues, and extend to all who have the happiness of approaching him.

Fifth Practical Observation.

Count *D'Auteuil*, an officer of well-known merit, Brigadier of his Most Christian Majesty's armies, received a shot in the left arm at the battle of *Coni*, in the year 1744.

The ball entered externally three fingers breadth above the elbow, traversed the bone obliquely upwards, and rested anteriorly under the skin. It was easily extracted by an incision of the teguments, and splinters two inches long were taken out, together with scraps of his cloaths; yet both the wounds continued to run obstinately, and degenerated into fistulous ulcers, communicating with each other, and accompanied with every bad complication.

After six months the patient went to *Paris*, to seek the assistance of Sir *Salvator Morand*, who freed him of another large splinter, and might probably have succeeded at that time

in completing his cure, had he been at liberty to make the necessary apertures ; but being opposed by the patient, and seeing that neither vulnerary injections, nor other applications of art, could much avail, because the bone being quite perforated by a caries, it's sinuous passages were scarce accessible to their influence ; he sent him in the spring to *Bareges*, whose waters readily made their way, and before the end of the season produced very great benefit ; the ulcers appeared deterged, the suppuration good, and all pain was quite removed.

He returned to *Paris*, and passed the winter there ; but still the wound continued open ; wherefore Sir *Salvator Morand* determined him to go again to *Bareges*, and to try another course of bathing and *douching*. This second application so improved the salutary effects of the first, that no remainder of caries or other evil complication appeared, and the sinuses filling up apace, a total cure was soon expected to ensue : But the unfortunate patient getting a fall, by which his arm was broken in that part which the ball had already shattered ; this new distress barred all hopes and further proceedings, till a fresh *Callus* was formed about the end of *September*, the usual time of quitting the baths.

However he resolved to stay a month longer, and accordingly employed all *October* with great assiduity in every proper application of the waters.

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He afterwards went to *Paris*, where a larger splinter of bone, probably the consequence of the late fracture, issued from the anterior wound of his arm, which still continued open; and that being the last impediment to re-union, a perfect cure followed in a little time.

Sixth Practical Observation.

Monfieur *de Germigny*, one of his most Christian Majesty's body-guards, having fallen from horseback on his left side, the handle of his hanger caused a violent contusion between the two last false ribs, whence proceeded an imposthumation, and afterwards a fistulous ulcer, which penetrated into the cavity of the belly.

No means were found capable of exhausting the purulency, to the generation and progress of which the fat annexed to the bowels is so naturally disposed, and which furnished floods of matter at every dressing.

The patient, a man in the bloom of life, abounding in flesh and vigour, became, by such a wasting discharge, hectic, meagre, and full of infirmities; till at length Monsieur *De la Peronie*, then surgeon to the King, sent him by litter in 1742 to take his fate at *Bareges*. He drank the waters mixed with milk, used every day the temperate bath, and regularly continued the injections of the hottest source,

to foment, deterge, and heal his many inward sores.

The process succeeded so well, that after two months this gentleman, from the most desperate situation, was restored to perfect health; and so effectual was his cure, that in five years after I saw him at *Avignon*, active and well, as if he had never had any disorder.

Seventh Practical Observation.

A Magistrate of the city of *Metz*, afflicted with a fistulous ulcer in the middle external part of his thigh, proceeding from a congestion of acrid humours, had recourse to *Bareges* in the year 1743.

The probe entering as deep as the bone indicated a caries, and discovered many sinuses, particularly one, which reached as high as the great † *Trochanter*, from whence descended profuse supplies of foetid malignant matter. Bathing, pumping, and the internal use of the waters, produced such favourable alterations in one season, that he soon afterwards found himself entirely cured.

In cases like this, created by vitiated juices, these waters include the double advantage of proving an internal as well as an external remedy; a merit which is truly rare: For, be-

† A boney protuberance below the hip.

sides their favourable effects in regard to the injured parts, they correct acrimony, and render the humours fluid, nutritive, and healing; qualities which alone can contribute to the regeneration and uniting of the solids.

These virtues in them are so noted among the inhabitants of the countries around, that they hasten with confidence to *Bareges*, when any such distempers come upon them; a conspicuous proof of their generally meeting with redress: For such people, biassed by no persuasive advice, can be influenced only by their senses, and the most visible effects.

In the dreadful malady called † *Empyema*, which often follows acute disorders of the breast, and where the chief organs of life are drowned in corruption, these waters, applied after the operation, are the most certain and speedy of all resources; their deterfive, healing balsam, and kindly warmth, communicated by injection, together with their internal use, fully answering every indication.

Eighth Practical Observation.

A sailor, afflicted with an *Empyema*, or collection of *Pus*, in the left cavity of the breast, in consequence of a *Peripneumony*, which the *French* call *Fluxion de Poitrine*, underwent the operation in an hospital at *Bordeaux*, and was

† A collection of purulent matter.

treated there, till despairing of a cure, he quitted it, and crept to these baths.

Repeated injections of the hottest source were daily administered, and every morning he drank two quarts of the same during a month. Great quantities of foetid matter issued from the breast, but decreased gradually till the end of the seventh week, when the injected water returned pure without any mixture, or smell of purulency.

From that time the ulcer began to close, rejected the *Canula* or pipe which had served for evacuating the matter, and soon after the patient was restored to health.

Ninth Practical Observation.

To the foregoing interesting case, it is not superfluous to add that of a labouring man of *Thoulouse*, produced also by an irruption of corrupt matter into the left cavity of the breast after a pleuritic fever, but attended with the aggravating circumstances of the disorder's being of a much longer date, and the vent's having been made the space of a rib too high, which rendered the discharge of the suppuration difficult.

No situation could be more desperate and perilous than this poor man's; a dead weight lay constantly on his stomach, as he expressed the bearing of the matter on the *Diaphragm* or midriff, and violent fits of coughing, with suffocations,

focations, rendered his life every moment precarious; yet the same means, as set forth in the preceding observation, being continued during three months, with a milk diet towards the end, conducted him to an entire recovery.

Quantities of *Pus* had been frequently observed in his urine, being doubtless transmitted from the foul breast into the blood by absorbent vessels, a cause sufficient for his hectic fever, and which the waters washed away by the most convenient outlet.

It is obvious from all we have seen, how well appropriated these waters are by baths, injections, and glysters, for the cure of ulcers in the bladder and *urethra*, as well as of the carnosities which often accompany them.

I am persuaded that no disorder of the latter sort, though ever so desperate, could resist their dissolving powers, especially if thereto be added the use of the *bougie* or medicated candle, so justly in present vogue. Its introduction would be always ready, and without pain or risk of uneasiness, being facilitated by the previous relaxation which the use of the waters would communicate to the parts, and both co-operating, must melt down and level every obstacle.

Their virtues are equally conspicuous for removing that grievous disease called a *fistula in ano*; which lies sometimes out of the reach of art, and often persist to afflict unhappy patients

tients after they have undergone the most painful operations.

Among many persons whom I saw relieved at *Bareges*, after unsuccessful operations for this disorder, it is sufficient to mention two.

Tenth Practical Observation.

A magistrate of *Thoulouse*, notwithstanding all the efforts of surgery, continued to suffer during fifteen months, and was at length obliged to have recourse to *Bareges*, with a perforation in the gut, callosities, and very foul supuration.

He employed with diligence temperate baths, hot *douches*, and injections, for the space of two months. Every day brought on a degree of amendment; and then embrocations, with lint dipped in the mineral water, became the only applications.

By this soft and simple dressing, the parts already disposed were permitted to unite, and in a fortnight after he returned home perfectly sound.

Eleventh Practical Observation.

A lady of a neighbouring province to *Bareges*, afflicted with a *fistula in ano*, and timidly averse to incisions, temporized with the evil, till it becoming insupportable, she went to these waters in quest of relief, which she soon obtained;

obtained; for by following the same course as mentioned in the preceding observation, she was entirely healed, and the year following I saw her at *Bagnieres*, without her having had the least relapse.

Monsieur de la Pugeade, an eminent surgeon of *Thoulouse*, is so convinced of the salutary powers of *Bareges* waters, in cases like these, as well as in *hæmorrhoidal* diseases external and internal, that, although a most skilful operator, he frequently sends his patients to be cured with ease and safety by them, making only simple incisions when necessary, for their ready admission to the seat of the evil; and if the distemper absolutely requires a complete operation, because of corrupt or gangrened parts to be cut away, he seldom fails to direct them, as soon as possible, to the same succour, in order to finish and ascertain the success.

In the *fistula lachrymalis* no remedy is so well adapted, and so efficacious, as this mineral fluid. It pervades the ducts, and fulfils every indication for freeing the natural passages of the tears, to a degree that no other deobstruent has been found capable of accomplishing; and in a manner subject neither to pain, nor to a remaining weeping, as the usual operation in surgery is.

Twelfth Practical Observation.

The daughter of a merchant in *Bordeaux*, with a *fistula* in each eye, was sent to these waters nine months after the commencement of the disorder, and after many vain trials for relief. Being provided with a proper syringe, the lachrymal ducts were injected four times a-day at the hottest fountain.

Fomentations and *douches*, by means of a tin pipe, which proportioned the volume and fall of liquid to the tenderness of the parts, were duly applied in their turns; and in six weeks time she was totally cured.

Of the many admirable effects produced by *Bareges*-baths, none are more interesting than some we shall relate concerning the *matrix* or womb, so fruitful of various disorders.

Ulcers, schirruses, and carcinomas, near akin to the cancer, are evils with which we often see this part infested, in consequence of it's structure and functions; and they are mostly regarded as irremediable: but the following consolatory examples present us with a far different prospect, and shew, that bounteous Providence has ordered medicines for the worst of disorders, were men always happy enough to know them.

Thirteenth

Thirteenth Practical Observation.

A lady, whose name it would be improper to use on this occasion, long the victim of a malignant ulcer in the womb, which wasted her extremely, by a constant running of blood and matter, was at length directed to these waters by Monsieur *de la Pugeade*, of whom mention has been already made.

The temperate baths, with repeated injections of the hottest source, conveyed into the cavity by a judicious hand, removed, in a few days, the scalding and great pains with which she was tormented; the suppuration lost its fetor, gradually lessened, and in a month's time ceased entirely. Soon after she returned to *Tboulouse*, rid of all her complaints.

What renders disorders of the *matrix* frequent, dangerous, and highly difficult of cure, is its lax glandular texture, endued with extreme sensibility, and subject to a great afflux of humours, from which easily proceed irritations and congestions, with their attendant train of evils.

Fourteenth Practical Observation.

The patient here treated of is a lady of *Austria*, who sought the help of *Bareges*, having for years before essay'd, to no purpose, various medicines,

medicines, as well as most of the mineral baths and waters in *Germany*.

She languished under the effects of a preying ulcer, which was judged to be in the bottom of the womb: frequent fluxes of blood with matter, and a *fluor albus* in the intervals, rendered her state as perilous, as it was dismal by hysteric affections and great lowness of spirits.

Against all this complication, the temperate baths, with injections of the hottest sources, and its internal use, prevailed so happily, that in the space of two months the lady was perfectly cured, and I was assured bore a child two years afterwards.

Thus we see these waters open the ways to conception; and doubtless they must excel in removing whatever obstructions may impede pregnancy, by their mollifying, penetrating, aperitive virtues.

Fifteenth Practical Observation.

A gentlewoman of *Thoulouse*, married at the age of nineteen, remained eight years without any signs of being fruitful: Her menstrual courses had been always irregular and scanty, which subjected her to cholics, pains in the back, and other ailments.

By baths, injections, and *Douches* on the loins, continued during a month, the menstrual drains were opened, and nature's ways became
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so free, that I saw her the year following mother of a fine child, and in perfect health.

How general the resource which appears here in favour of the sex, the greatest share of whose diseases proceed from disorders in the organ of generation.

The instance which ensues, of the mollifying resolute powers of these waters, is very remarkable, and merits a place.

Sixteenth Practical Observation.

An old woman-servant at *Bareges*, in lifting a burthen, made such efforts as caused a descent of the *matrix*: It soon swelled, inflamed, and was distended so as almost to reach her knees.

A surgeon, who was applied to, tried every proper topic he could think of to no purpose; for the part was in danger of being gangrened; when I sent the poor sufferer to be put into the temperate bath, which in one hour gave her great relief from her desperate pain, and by keeping her therein during twelve, so entire a relaxation was produced, that the replacement of the part was performed without any difficulty.

Here is to be related a case, to which I believe no parallel is to be found in the history of physic; the cure of an inveterate *carcinomatous* tumour in the neck of the womb; and it
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is lucky for it's authenticity, that the most unquestionable witnesses appear to vouch and place it beyond all doubt.

Seventeenth Practical Observation.

A married lady of *London*, of the age of twenty-six years, having suffered for some time great irregularity in her monthly courses, with many attending indispositions, particularly sharp pains in the region of the *Uterus*, and in the left groin, had recourse to Mr. *Douglas*, eminent in the obstetrical art, who, upon examination, discovered a *Schirrus* in the left side of the interior orifice of the womb; a most disadvantageous situation, because of the great contraction and tension of the fibres in that part, as also its connections with the bladder and strait gut, productive in the present case of mutual inconveniencies.

He employed medicines, especially mercurial; notwithstanding which the disease continued, and in two years after, the patient being then at *Paris*, it's encrease was so considerable, that she was attacked by ailments on all sides; constant pains in the *pelvis* or basin, posteriorly and often anteriorly, both which were always exasperated in the moments of evacuation.

Besides excessive sufferings towards the periods of the *menstrua* attended her; and at times such irritations invaded the whole belly, as to
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cause inflammations, of imminent danger to life ; all consequences of the nature and connections of the *Viscera*.

Hereupon Sir *Salvator Morand* and Monsieur *Petit*, most eminent surgeons, being applied to, they found the scirrhus tumor of the shape and size of a small pear, pressing laterally on the *rectum*, or strait gut, as well as on the *psoas* muscle, and sciatic nerves ; the cause of her lameness, which was a further grievance she endured.

The case appearing desperate, Messrs. *Dumoulin*, *Astruc*, and *Reneaume*, celebrated physicians, were called in, to consult the best means of relief and safety. Bleeding, domestic baths, clysters, which, though anodyne, she could scarce bear, emollient injections, mild aperitives, and gentle purgatives, were administered in their turns ; but to no advantage : for the evil proceeded with rage, and acquiring new malignity during a fever, which seized the patient, it became at length a perfect *carcinoma*.

Then recourse was had to Doctor *Boerhaave*, the oracle of physic ; and the Lady's confidence in his great science engaged her to go as far as *Leyden*, that she might consult him in person.

He sent her to the waters of *Aix la Chapelle*, of which she made internal and external use during two summers : they often excited such a heat and ferment in the blood, as ob-

liged her to intervals of cessation. However, in the end, her great pains were assuaged, and the lameness diminished : but this amendment was of short duration ; for in the succeeding winter, at *Paris*, she became as much disordered as ever ; and Sir *Salvator Morand*, having examined the state of the tumour, found it no way changed.

Palliating, calming medicines being the only ones to be attempted, especially in that unfavourable season, despair of redress was every day taking place, till the patient was raised to new hopes by the wonders related to her of *Bareges*-waters in cases similar to her own.

She went thither in *June* 1739, and soon began to feel their benign influence : the first temperate baths quite eased her pains, and procured her rest ; by continuing them together with injections, clysters, *Douches*, and drinking the waters, every symptom gradually abated ; and after three months, being the term of a season, she found herself so well as to travel post without the least inconvenience ; a prodigious alteration in such a space of time : nor is it less surprizing that a medicine of so much efficacy, and employed in so many ways, without a day's interruption, caused neither fatigue, nor tumult in the constitution ; but on the contrary, contributed to a constant composure, and to every improvement of health.

In the spring following, the lady returned home to *England*, thinking herself entirely cured,

cured, and enjoyed that agreeable opinion during eight months, till the moist winter season occasioning new indispositions, particularly congestions of phlegm in the stomach, her frequent reachings produced a revival of pains in the schirrous part, whereby it was easily perceived that the evil was not entirely eradicated.

Doctors *Mead*, *Hulse*, and *Connell*, tried for her relief all the means within their knowledge; yet her disorders continued, and the summer being at hand, they advised her return to *Bareges*, concluding it the only resource.

Arriving there in *June*, she proceeded in the same methods of using the waters as before, and with the like advantages; for her pains were soon removed; and the stomach, freed from all foulness, recovered it's due tone and functions. She passed the winter with tranquility at *Thoulouse*, determined not to quit the neighbourhood of *Bareges*, till her cure was rendered compleat and certain.

On going thither the succeeding year, Monsieur *de la Pugeade* examined the state of the induration, and comparing it with the report which had been made by the surgeons of *Paris*, the diminution was found very considerable. It being the patient's third year of recourse to these waters, new measures were to be devised for improving the present amendment, and a last effort to be made for eradicating so obstinate a distemper. The great

point was to facilitate their contact with the schirrous part, and procure a full scope to their dissolvent powers.

These ends were happily obtained by my expedient of a tin-pipe, one extremity of which formed a funnel, and the other was, by an intermediate leathern duct, joined to a very smooth ivory-pipe.

The patient being properly situated before the hot fountain, introduced this *cannula* into the passage of the womb, as high as the inward orifice, and then a female attendant held the funnel under the spout, whereby the emollient stream, in manner of a *Douche*, poured it's detersive influence against the sore. By this operation, a sanious matter continued for more than a month to drain from the part; after which, every thing appeared well, no symptoms of the distemper being perceivable.

However, to obtain all possible security in so interesting a case, she returned the following season to these admirable baths, and was so radically cured of a disorder deemed incurable, that the surgeons formerly consulted found, upon re-examination, no trace of it remaining; and, to my knowledge, fourteen years elapsed without the least token of it's having ever existed.

The malignancy of cancers has always imposed despair on the unhappy sufferers, they being of so rebellious a nature, as to be exasperated

perated by whatever applications have been used to remove them; whence the epithet of *noli me tangere*.

But *Bareges*-waters present no small consolation in this dreadful malady; for if they do not entirely cure it, they at least stop it's devouring progress, and save the patient from pain, by mollifying and refreshing the tender nerves and vessels, by washing away the corrosive salts, and by preventing inflammatory dispositions; nor can such a degree of redress be deemed less than a high felicity, amidst the horrors of an evil, concerning which an author says,

Una salus victis nullam sperare salutem.

Eighteenth Practical Observation.

I saw at *Bareges* a gentleman of the country of *Montpelier*, in *Languedoc*, who having lost the cartilaginous end of his nose, by a cancerous humour, had recourse to these waters for the second time, in hopes of obtaining that relief, which he had in vain sought for by other medicines.

In effect, by their use the part being freed from all foulness, became dry, retaining neither heat nor irritation; and it was so far cured, that, no cancerous appearance remaining, there needed only a patch to defend it from the air.

We have reason to expect the like success against cancers in any other part of the body ; especially when perseverance in the external application of this balsamic fluid is also seconded by it's internal use, to which no alterative proves superior in correcting vitiated juices.

And this is evinced by examples in other most perverse diseases ; witness the cures performed by these waters in the *Scrophula*, commonly called the King's Evil.

Nineteenth Practical Observation.

A son of Monsieur *Maruquet*, of *Tboulouse*, aged seven years, was carried to *Bareges*, in the worst degree of a scrophulous disorder.

All the salival glands were deeply ulcerated, with hard inverted lips, and many others were greatly obstructed.

The Bath and *Douche* soon displayed their emollient cleansing powers : but it being presumable, from the extreme indurations in the roots of the glands, that the cure would be tedious, I joined the help of mercurial frictions, which were, in due times and qualities, administered after bathing ; a method I shall have ample occasion to discourse of, in some following important observations.

The child was thus treated during three months, his food being milk, or cream, with bread, and his constant drink the mineral waters ; whereby he acquired strength, assumed

a wholesome colour, and was totally freed from every symptom of the Evil ; nor had he for years after, I having had the opportunity of enquiring, any kind of distemper, except an accidental defluxion on his eyes.

There can be no doubt of the mercurial ointment having been assistant in this remarkable cure ; but the utmost to be allowed, is it's having co-operated with the waters ; since we see that, alone, it seldom or never eradicates the genuine scrophulous taint, which the waters, by due continuance, certainly do, as appears from many instances among the poor, who haunt *Bareges* every season, for redress in this cruel malady.

Many dread all use of mercury, because of it's horrid consequences, seeing that when administered precipitately, and in large doses, it produces a salivation : but the management of this mineral, according to various temperaments, is now so well known to the skilful, that there is no room for such fears ; especially when united with the virtues of these baths, which keep up a constant flow of perspiration, and by that most salutary discharge avert all flux of humours from the salival glands.

This I have seen proved with the most delicate constitutions, and in the compleatest courses of mercury, for the cure of venereal diseases ; of which satisfactory examples will be here produced.

Effectual as we find these applications against scrophulous tumours and ulcers, they are equally so against other kinds, attended with the most obstinate indurations.

Twentieth Practical Observation.

A gentleman of *Montpelier*, having had a swelling in one of his testicles, it became a *Sarcocoele* of a considerable bulk, which at length imposthumated.

The purulent matter made its way through the body of the gland, forming many sinuses; nor was the care of the best surgeons like to prevent the loss of the part.

In this dangerous state, the patient betook himself to *Bareges*, where his apprehensions soon began to vanish.

By Baths and *Douches*, together with mercurial frictions on the testicle only, the ulceration changed daily for the better, and the tumour sensibly diminished. This success encouraged his return the following season, during which I saw the further progress and completion of his cure: the part was reduced almost to its natural size, and thoroughly healed, except a small aperture in the teguments, which had been purposely reserved for admitting the bath-water, and was easily to be closed by any common dressing.

Such important examples as those already produced, fully evince the truth of all I have advanced, concerning the superior virtues of these mineral fountains, in curing wounds and ulcers, with their frequent train of afflicting complications; and to add more than necessary on the occasion, would betray the affectation of proving too much, or the vanity of rendering my treatise voluminous.

C H A P. II.

Of the Cure of Nervous Contractions, Anchylofes, Nodes, and Exostofes; with practical Observations.

TH E S E disorders follow, in due course, to be treated of after wounds, from which they often take their rise: and it likewise appears proper to range them under one head; seeing that whatever may be their circumstantial difference, their material cause is always the same, *viz.* a lymphatic mucilaginous humour, more or less inspissated; which, according to its places of congestion, in the membranes, joints, tendons, or bones, produces a variety of evils.

For the removal thereof, a medicine is required, whose powers, without offending nature, can reach to, and search, the extreme recesses of the body, pervade its compactest texture,

texture, dissolve fixed concretions, and, what is a principal point, work a salutary alteration in the whole mass of fluids.

Bareges-waters possess every virtue adequate to these indications, as the following examples will shew.

Twenty-first Practical Observation.

A lad about twenty years of age, whose legs had been from his infancy quite bent under him, by a * contraction of the flexor tendons, so strong, that no force could effect the least extension of them.

This helpless creature was carried to *Bareges*, by a charitable lady of *Marseilles*, who, on her road thither, saw him begging, and conceived the hope of his cure.

It was proper to begin with the temperate baths, and to render them of long duration, in order to macerate and relax the extreme rigidity of the nervous cords and tendons: but a crowd of diseased persons, of all conditions, being then at *Bareges*, it was impossible for this poor patient to enjoy the requisite use of the baths, even by night, as every hour was allotted; so that his amendment was not great during the sea-

* The *French* give this disorder the appellation of *Cul de jatte*; because those who are unhappily afflicted with it use a machine of wood or leather, in form of a bowl, round their buttocks, to facilitate their bearing on that part, the only one on which they can move.

son. However, the trial for such a cure being very important, I engaged him to stay there during the winter, with advice to pass every hour of the day in the warm water; a comfortable abode enough, amidst the snows and excessive cold which attend this region in that season; his benefactress, with others, having contributed to a fund for his subsistence.

As the nature of the case interested every body, he was, with all necessary instructions, committed to the care of the keeper of the baths and barracks, the only person who remains in the place.

On my return, in *June* following, so prodigious were the effects of these resolute baths, that I found him quite straight on his legs, without any difficulty in moving; and during two seasons afterwards that I frequented *Bareges*, he continued to run on errands for any that would employ him.

This extraordinary cure, of which I believe there is no instance by any other medicine, shews not only the resolute virtues of these waters, but also the advantage of due application and perseverance; for want of which many continue the victims of their diseases: for, had this poor boy used the baths, in the common manner of staying in them hours only, instead of whole days, he never could have got the better of a state so inveterate, where cartilages, ligaments, and tendons, were to be rendered so pliant as to recover their functions,
and

and the articulations to be pervaded in order to dissolve the concretions which filled their cavities, the causes of *Anchyloses*, and certain consequences of the inaction occasioned by inveterate contractions.

Twenty-second Practical Observation.

An aged father Capuchin, having the fingers of his right hand contracted to the palm, came to *Bareges* for relief: the case was far from being hopeful, because of it's long standing, and of the dryness and rigidity which attend on old age; yet the temperate bath, with hot *Douches*, cured him in ten days; and what doubtless contributed much to so speedy an effect was, his keeping his arm steeped in a trough, replenished with the mineral water, every day while in his room.

Twenty-third Practical Observation.

A general officer in the service of *Spain*, and native of a country rendered illustrious abroad by the military virtues of it's sons, came to *Bareges* covered with scars and cicatrices, the painful vouchers of his bravery. At every change of weather, as well as when warm in bed, he suffered violent twitches and aches in many places, particularly about the right knee, where he had received a shot.

By

By six weeks daily perseverance in using the temperate bath, together with some hot *Douches*, the compressions occasioned by the callous cicatrices, and the distensions caused by an irregular union of the nervous and membranous fibres, were removed, so that the patient enjoyed ease, rest, and freedom of motion: Whence we see the important utility of these baths to the wounded, even after they are healed.

Twenty-fourth Practical Observation.

An inhabitant of the valley of *Argilles*, near *Bareges*, was freed in one day's time from a stiffness in his arm, accompanied with a contraction of the fingers, caused not long before by an effort in working.

This fact having excited the public wonder, and a curiosity to see the man, particular notice was taken of it by every body in the place; and it must be owned with reason, because of the suddenness of the cure; though the disorder's being very recent was a favourable circumstance.

It is plain how appropriated these waters are to the relief of all spasmodic and convulsive affections, the dominion of which is so extensive and afflicting.

Twenty-fifth Practical Observation.

The child of a merchant at *Bordeaux*, tortured by general convulsions during three years, after having had the small-pox, probably from a retention of some of the morbid matter, was entirely cured by two months use of the baths.

I have seen persons rendered miserable by cramps and other disorders, proceeding from an unequal tension of the nerves, and inordinate motion of the spirits, in like manner freed from their complaints.

All indurated tumours proceed from lymphatic congestions, more or less consolidated, according to the nature of the parts which they attack, and in proportion to the degree of local heat which dissipates the fluid, as well as of the quantity of salts which serve to fix the concretion.

After having seen the surprizing cures performed by these waters in cases of inveterate callosities, of the *Scrophula*, and a carcinomatous schirrus in the womb, we now come to the most knotty of diseases, *Anchyloses*, *Nodes*, and *Exostoses*, which likewise yield to their powers, when duly employed.

It is truly admirable, at *Bareges*, to observe persons long beholden to crutches, forget by degrees their accustomed props, and after some months bathing, walk about as if nothing had
ever

ever obstructed their motion : nor ought we to be surprized that the common people, who judge of events without reasoning, attribute a divine virtue to these springs, and dignify them with the high title of miraculous.

Relative to our present subject, Doctor *Dessault* gives the extraordinary example of Monsieur *Sifredy*, a French officer, who had an *Anchylosis* in the knee, of fourteen years duration, having all that time used a wooden leg, and who, by a happy trial of these waters, was in one season set on his feet again.

Doctor *Dessault* adds, that the officer being returned to his home at *Bordeaux*, in this new situation, his friends could scarce believe their eyes, or take him to be the same man, because of a change which was deemed impracticable by any natural agent.

The same credible author relates another history, concerning an officer shot in the thigh ; that, after his wound was healed, the member became paralytic, and daily decayed ; for which the only cause to be assigned was, a compression on the sciatic nerve, from adhering nodes, or contiguous callosities, the ball having passed close by it.

No other means of relief appearing, the patient had recourse to these penetrating baths, which readily found their way to the entrenched evil, and restored nutrition, action, and strength, to the part.

Though

Though *Anchylofes* sometimes proceed from internal causes, they generally succeed such fractures and great wounds, as necessitate a long inaction of the joints; for then the oily liquid, destined to supple them, stagnates, grows hard, and fixes the contiguous bones, just as in a mass of cement.

The difficulty of dissolution is plainly very great, as well on account of the nature of the concretion, as of the inclosing teguments, by their number, and compactness, found impervious to any other application than this sovereign fluid.

Mercury, that great de-obstruent, is far from being equal to the task: It may prove an auxiliary, when rubbed at times on the part, and is best when incorporated with the sediment of the baths; in which way I have frequently ordered it, and think it most efficacious, because of the very penetrating nature of this soapy matter, so superior to that of any turpentine, or animal fat.

Twenty-sixth Practical Observation.

A *French Nobleman*, after the tedious cure of a gun-shot wound, complicated with a fracture of the *Humerus* bone near the elbow, found himself in the melancholy case of an *Anchylosis*, formed in it's articulation.

Every

Every emollient and resolvent application was put in practice, in hopes of overcoming the disorder, while recent ; but all proved ineffectual.

The year following, he went to *Bareges*, where I saw him perfectly cured in nine weeks time, by the temperate baths and hot *douches*.

Twenty-seventh Practical Observation.

A magistrate of *Thoulouse*, who for many years was troubled with a very large *nodus*, adhering to the flexor-tendons of his right leg, and which at length quite hindered his walking, was freed from it in six weeks by baths and *douches*, together with the soapy sediment rubbed daily on the induration.

Twenty-eighth Practical Observation.

A young man of *Saintonge* went to *Bareges*, with a considerable tumor on his throat : it was of the kind which the *French* name *Gua-*^{*Goutte*}*tre* * ; but had very uncommon effects.

It occupied the whole *thyroidal* † gland, and extended transversely as far as the jugular

* Such tumors are common in mountainous countries, and are occasioned by the crudity of the waters which the inhabitants drink.

† That prominent gland which possesses the fore-part of the wind-pipe.

veins, which, by it's adhesion and weight, were so compressed, that the return of the blood was much obstructed; whence ensued a constant redness in the face and eyes, and the latter even became remarkably salient, from the great turgidity of their vessels.

He was moreover tormented frequently by a difficulty of swallowing, and often of breathing; and all the motions of the neck were likewise impeded.

Thus distressed, he was put into the temperate bath, and lay therein immersed to the chin as long as he possibly could.

After some days, a degree of freedom in moving the head being gained, gentle *douches* of the second hot source were added, and at the end of a month every symptom attending his dreadful situation was so much abated, that it may be said the patient was restored to the enjoyment of life.

The tumour became soft, moveable, and diminished at the rate of six, and sometimes more lines, in a week, as was verified by a paper-band, which served as a measure.

I ordered the ointment composed of the bitumen of the baths, with mercury, to be applied on the part, and things continued to proceed in the most hopeful way.

However, seeing the season for staying at *Bareges* half spent, and deeming it essential that the utmost endeavours for extirpating the evil, root and branch, should be put in practice

tice without delay or intermission, I determined the patient to go through a compleat course of *mercurial* frictions, together with the baths and *douches*, in the manner heretofore mentioned; and which, in the sequel, will be fully illustrated.

These combined resolvents operated so powerfully, that after four months the patient was entirely freed from the *guatre*, and all its consequences.

Twenty-ninth Practical Observation.

A gentleman of the country of *Bordeaux*, whose face was disfigured by two great *exostoses*, one in the angle of the lower jaw, and the other in the cheek-bone, had tried many remedies, particularly a formal course of *mercurial* frictions, but all in vain.

He at length betook himself to these waters, and after a season found some diminution of the osseous protuberances, sufficient to encourage his return the following year, in which I saw him.

His hopes of a cure being justly raised, he recommenced the baths and *douches*, which continued to operate a visible amendment: however, to accelerate the success, notwithstanding a prejudice he had imbibed against any further use of mercury, I prevailed on him to admit the application of the ointment mentioned in the foregoing observation, which, after

the baths and *douches*, 'was assiduouſly worked into the parts by friction, and in the intervals they were kept covered with diſſolvent plaſters.

These means proved ſo effectual, that at the end of this ſecond ſeaſon very little of the *exostoſes* remained, and ſix weeks of the third ſufficed to baniſh them quite out of ſight ; a tedious, but it muſt be owned a prodigious cure.

It is evident that the great agent herein was the waters ; for the courſe of mercury, which the patient formerly underwent, having produced no change in his favour, it's latter application with the baths, can be regarded only as in ſome meaſure ſubſidiary.

This is truly conformable to reaſon and experience, ſeeing we have daily examples of medicines performing, in conjunction, what they are found utterly incapable of, when ſeparately uſed. It is eaſy to conceive the dependance which bodies may have on each other, in co-operation.

C H A P. III.

Of the Cure of cutaneous Distempers, with practical Observations.

BY this time, surely, it is obvious, how sovereignly medicinal a fluid, emollient, penetrating, and cleansing as that of *Bareges*, must prove in cutaneous distempers. I am confident that even leprosy would yield to a due perseverance, in it's internal and external use; particularly, if the times of bathing were rendered as long as possible: for after the body is once well steeped, and the pores together with the capillary vessels fully dilated, their powers proceed by a perpetual multiplication of effects against the peccant matter; an advantage very necessary, where the most intricate ways are to be opened, and the most difficult obstructions to be broke through; which can scarce be obtained by baths, though ever so frequent, if their durations be short.

And truly, considering the benign influence of these waters, how they *recruit, and maintain the animal spirits, I can apprehend no inconvenience from a person's †lying for days suc-

* Vide Chap. VIII. Part I.

† Vide Practical Observation XXI.

cessively in the temperate bath ; whose fresh streams constantly lave and sooth the body, a proper machine being formed to keep him in a due situation during sleep: and what external foulness can resist such a course?

Thirtieth Practical Observation.

A gentleman, subject to cutaneous eruptions from his infancy, had, after the age of thirty, been infested, during fifteen years, with so violent a progress of the disease, that his body became an universal sore.

Being opulent, he spared no expence, in going through every medicinal process which had been advised, and particularly a course of mercury, twice repeated at *Montpelier*: notwithstanding all which, the infection obstinately persisted.

It was generally deemed an inveterate scorbutic taint ; and with this opinion agreed the bad state of his teeth and gums : but when I saw the patient at *Bareges*, it had all the appearances of being tetters, than which no evil is more difficult to eradicate.

He applied to drinking the mineral water, to a daily use of the temperate baths, and at times of the hot, in order to force perspiration : the whole was aided by a milk diet, and in two months he was entirely cleansed.

I met him six years afterwards, when he assured me that there had not been the least return of his distemper.

Thirty-first Practical Observation.

A lady from the island of *Martinico*, long afflicted with itching pustules and running sores, was, by the same methods as set forth in the preceding case, thoroughly cured after a stay of six weeks at *Bareges*, where like instances are seen in numbers.

I have observed that mercurial frictions, properly applied with the baths, often prove assistant to a more speedy removal of these kinds of infection; though alone they are, for the most part, known to be ineffectual.

It is indeed surprizing with what facility these waters insinuate themselves into the minutest vessels, attenuate the obstructing matter, and operate it's escape by perspiration.

I saw an *Erysipelas*, commonly called *St. Anthony's fire*, in a man's leg, cured by his staying three hours in the temperate bath.

There are local cutaneous diseases, independent of taint or vice in the blood, which proceed merely from it's red particles entering the capillaries destined to receive the lymphatic or ferous juices only.

These are very difficult to redress, because of the attending relaxation: however, *Bareges*-waters perfectly answer the first indication, *viz.*

that of freeing the vessels of their misplaced contents ; but to endue them with the force of resisting a return of the globules, cold bathing should necessarily follow, and might complete the work.

I have seen hot and cold baths taken successively, without a moment's interval ; that is, the patient rising from the one, with all his fluids rarefied, his solids dilated, and pores opened, plunged into the other ; and though such transitions seem dangerous, I did not observe, neither do I apprehend, any other than salutary consequences from them, in bodies whose organical parts are sound ; nor can those who are acquainted with the animal œconomy be at a loss to conceive the important changes they are capable of effecting, in many distempers : how the vibrations thereby sent along every fibrous thread, serve to quicken the languid motion of morbid humours, to break their cohesions, expel them by various ways, and restore elasticity to the solids.

C H A P. IV.

*Of the Cure of Venereal Diseases
at BAREGES, with Practical Ob-
servations.*

HAVING seen many proofs of the favourable co-operation of these waters and baths with mercury, I was led, notwithstanding the loudest prejudices to the contrary, to think that, together, they would prove a complete and sovereign remedy, for the worst degrees of the venereal disease; and considering the afflicting complications of indurated tumours, ulcerations, and caries, often attending it, to all which they present special relief, I beheld every advantage in this junction, as well as in the method, which had already occurred to me, of applying the mercurial frictions immediately after bathing; a method proposed by Monsieur *Haguenot*, professor of physic at *Montpelier*, with common water; and which, having once successfully experienced it, I concluded must answer to the highest perfection, with a fluid so penetrating and transcendent in medicinal qualities, as that I treat of.

The difference between this manner of proceeding, and that usually practised at *Montpelier*, called *Extinction*, consists in the arrangement

ment of the baths ; that is, in the latter their whole course precedes the frictions, and, according to the former, in favour of which much is to be said, they are administered alternately : but both, rightly conducted, agree in extirpating the venereal taint with certainty, ease, and safety, without the horrors of a wasting salivation, rendered purulent, and nauseous to every sense, by the foetid ulcerations, which the rash and precipitate use of so ponderous and active a body as mercury creates.

We shall see how the assisting virtues of *Ba-
reges*-waters improve the powers of this mineral, and perfectly secure it's application against disorders which sometimes happen, such as swellings, inflammations, and bloody fluxes ; as well as against consequences more afflicting than the primitive disease ; *viz.* contractions of the masticatory muscles, with callosities, impeding the free opening of the mouth, hectic disorders difficult to be remedied, and in short, the ruin of the springs of a constitution.

The process I have to propose appears superiorly adapted to all the indications, for radically curing the most inveterate venereal diseases, with their worst complications.

First, because the body is kept always prepared, by the bath's preceding each friction : for, by it's mollifying influence, the pores are widened, the vessels rendered pliant, the resistance of the solids is lessened, and every happy

py disposition made for an easy admission of the mercurial particles.

Moreover, it is to be considered, that baths of so penetrating a nature as these of *Bareges*, furnish, by absorbing conduits, supplies of fluid, which constantly humect the habit of the body, promote circulation, and, consequently, a ready conveyance of the mercurial specific through the minutest vessels, and intricate windings of the glands, the seats of the infection, there to exert it's alterative powers, and to dispose the vitiated humours for being expelled by the most convenient outlets.

Add to this the direct concurrence of these waters with the mercury, in dissolving coagulations, rooting out obstructions, and depurating the animal juices.

Secondly, they suffice to deterge and heal the foul eruptions, or ulcerations, which often accompany the venereal evil.

Thirdly, in cases of *Caries*, they, by their proper virtues, are capable of procuring exfoliation, whereby the patient is exempted from frightful cauteries, and other tormenting applications.

Fourthly, these excellent waters, dissolvents as we have seen them of † *Exostoses* and *Nodes*, are equally such of *Carnosities* in the *Urethra*; cruel and frequent attendants on the malady here treated of: And I am persuaded, that however great their inveteracy may be, assiduous bathing, with injections, will certainly

† Vide chap. II. Part II,

ly extirpate the disease, especially if seconded by the use of the *Bougie* or medicated candle, at present so justly in vogue. What other assistant so fit as this balsamic liquid to dilate and smooth the passage for it's introduction, without pain or uneasiness? a point of the utmost consequence.

And let it be observed that *Bareges*-waters prove a remedy, even against those evils which oftentimes proceed from a salivation; as callosities in the mouth, and a wasting spitting, which inevitably brings the patient to a languishing end.

Fifthly, this manner of administering the baths and unctions alternately, saves that irksome space of time, usually spent in preparing the body; for as soon as the patient has been blooded, purged, and disposed by two or three temperate baths, the only proper ones in this course, the frictions may be commenced.

The doses of ointment are to be regulated according to its effects, the person's strength, and the degree of infection; on the observation whereof depends the science of this process, which requires much attention, judgment, and practice.

It is to be remarked, that less mercury serves for a cure with these waters than otherwise, because of their auxiliary powers; and withal, it may be applied without risk, in shorter intervals and larger quantities, on account of the constant favourable discharges
which

which they promote, by perspiration as well as by urine ; and consequently a course here proves more expeditious. The ointment which I prefer consists of one half mercury, to avoid a redundancy of grease, which serves only to clog the pores ; and I find that by a mixture of equal parts, the mineral, being first extinguished in a little turpentine, is sufficiently divided ; which answers the whole intention of the composition.

I have sometimes had it incorporated with the bituminous sediment of the baths, which excels any other additament ; inasmuch as the ointment made thereof, by very gentle rubbing, entirely pervades the skin ; but as this inspissated mineral oil is less tenacious than animal grease, it is necessary to employ a greater portion of it, for a perfect separation of the mercurial particles ; and as they are so naturally prone to re-union, care must further be taken to increase the turpentine, and to use the composition always fresh.

The diet to be observed with this mercurial course, and in general recommendable to patients at *Bareges*, consists of good broth, made of beef and fowls, with a moderate portion of chicken, tender veal, or other white meat, at dinner, and for the rest of the day, milk or cream at discretion, which in these mountains, covered with fragrant pasture, are equally delicious and salutary.

It

It is easy to have milk fresh drawn at all hours, or, being kept in a proper vase, to restore at any moment it's kindly natural warmth, by immersing it in the hottest fountain: so great is the || analogy of these liquids in this respect.

The ordinary drink to be most approved of is the mineral water.

It dilutes more than any other, imparts a balsam to blunt the acrimony of the juices; enables the most disordered stomachs to continue the use of milk with success, and is to be regarded as a great accessory to the cure.

The properest season for this medicinal undertaking, is from the middle of *June* to the latter end of *August*; because in fine weather, the patient may every day breathe fresh air, by opening the windows of his room, without danger.

In 1742, as well as in the ensuing year, I experienced the method here set forth on seventeen persons, some of whose cases are adjoined: They were all cured with safety, ease, and expedition.

It may even be fairly said that they underwent no constraint, worth complaining of, having had the pleasure of changing their linen, of dressing, and seeing company, at will.

Many are so deluded as to think salivation the most effectual way of cure, because they see much corruption flow from the mouth, which they imagine to be the matter of in-

|| Vide chap. V. Part I.

fection:

fection: but their mistake is great; for that matter proceeds from ulcerations, which, as has been said, are merely the work of mercury, and of a ferment raised in the humours tumultuously driven through those glands, which offer the least resistance. Thus the pure and impure are promiscuously emitted, just as in bleeding; and doubtless the mercurial particles often escape with the salival stream, before they have time to produce any alteration on the vitiated juices, or can perform the functions to which they are destined: Consequently, this process is fallacious, as patients are, according to the usual term, frequently missed thereby, after suffering extreme pains.

I do not mean that all, who are affected with the venereal disease, should be obliged to fly to *Bareges* for relief; since numbers, by due management, are perfectly well cured in other places. I only point out the great assistant advantages of its waters, to those who are infected to a very high degree, and afflicted with the dreadful complications before mentioned.

Thirty-second Practical Observation.

The first patient I met with, for a trial of the method in question, was a servant of the Earl of Crawford, whose distemper, notwithstanding repeated salivations, with other medicinal

cinal courses, had subsisted for many years, and was almost at the worst.

He was extremely emaciated; his nails and hair had, in part, fallen off; he had a deep ulcer in his loins; several in the throat, as well as about the privy parts, besides many indurated excrescencies; and the *Uvula* had fallen off by a mortification: the pains in his legs, arms, and head, were constant; he was miserable for want of rest, and looked like a spectre.

I began by ordering him to be gently purged; he was in too weak a state for bleeding: next day he was put into the temperate bath, during two hours, which was repeated four days successively: his diet became totally milk and cream, which I judged necessary, as the most effectual restorative; and he drank the mineral water, sometimes pure, sometimes with milk.

Things being so disposed, the mercurial frictions were applied in the manner following, of which I think proper to give a minute detail, as of every event in this case, and the two subsequent, that a sufficient judgment may be formed of the rest, which it would be tedious and needless to insert.

The 12th. of July, after bathing, two drams of the mercurial ointment were rubbed on one of the patient's legs, it being customary to begin with the lower extremities, and to rise gradually to the other parts.

On

On the 13th. and 14th. a bath each day, followed by rubbing in two drams of the ointment.

15th. Neither bath nor friction: the patient slept somewhat better than usual.

16th. Bath, and frictions repeated.

17th. Both omitted.

18th. and 19th. Both repeated.

20th. Same applications; the gums became somewhat sore; the ulcers of the throat and other parts appeared much deterged; the nocturnal sweats were lessened, and the patient found some encrease of strength.

During four days nothing was done, besides keeping him to his medicinal restorative diet of milk and cream, together with the internal use of the waters.

25th. The soreness of his gums being vanished, and all circumstances according to wish, a bath was used, and followed by a friction with three drams of the ointment.

26th. and 27th. The same.

28th. Both omitted.

29th. Both repeated; the soreness of the gums returned; whereupon clysters of the hottest bath-water were injected, which greatly served to divert the humours from the mouth.

30th. Suspended all, except the clysters.

31st. No remainder of soreness in the gums; reassumed the bath and frictions, as before.

August 1. Continued the bath, and encreased the unction to four drams: the patient was

rid of his pains, and quite restored to his natural sleep; the ulcers were in a fair way of being soon cured.

2d, and 3d. Baths, with the frictions, as the preceding day.

4th, 5th, and 6th. Neither bath nor unction; the patient's strength was greatly encreased, he being able, on occasions, to serve his Lord. I allowed him henceforth to dine on soup and fowl.

On the 7th. Bath, and friction with four drams of ointment.

8th, and 9th. No application; the ulcers were quite healed, and the warts with other excrescences effaced.

10th, 11th, and 12th. The bath was repeated each day, as also the friction with one ounce of ointment; prodigious doses! but incapable of any mischief in a body whose vessels were every where rendered yielding and pervious: for it is through the rigidity and irregular tone of the fibres, that mercury being hindered from rolling and circulating freely with the humours, rushes on some tender feeble part, and proves often fatal, instead of salutary.

It is worthy of remark, and known to most practitioners, that this mineral after being once perfectly diverted from the glands of the mouth, may be boldly employed, and in great quantities, as appears in the present case, without affecting them again: because the ways of circulation being well opened, and habituated
to

to it's action, offer no resistance afterwards; which confirms what I have just before said.

After such a compleat and prosperous course, as the patient had gone through, I reasonably concluded that he was entirely cured: however, he continued in a due regimen of living, in order to give the specific medicine time to exert it's utmost effects, which never should be interrupted by purgatives or other means; for the success of this method by *extinction*, depends not more on evacuations, than on alterations produced in the very principles of the distempered fluids, whereby they are partly assimilated to the mass, and partly thrown off by the different *emunctories*.

After fifteen days, he complaining of new pains in the shoulders and arms, though they were probably rheumatic; I ordered the baths, with the mercurial frictions, to be repeated, that no room might be left for suspecting any lurking remains of the venereal-taint.

September 3. A temperate bath of two hours duration was used, and followed by a friction on the shoulders with half an ounce of ointment.

5th. The bath repeated, and the same quantity of ointment rubbed on the arms.

7th, 8th, and 9th. Proceeded as before; the frictions being performed on the legs and spine.

After some time mild purgatives were given at due intervals; and thus concluded a cure,

than which few or none of the kind can be more important, and attended with so much ease, safety, and success.

The patient continuing sound and hearty, departed from *Bareges*, with his Lord, in the following month.

Thirty-third Practical Observation.

A Lady of the country near *Tboulouse*, infected to a high degree with the venereal distemper, doubtless by her husband, went to *Bareges*, encouraged by the accounts she had heard of persons cured there, in such a speedy and agreeable manner.

After bleeding, purging, and five temperate baths, the first friction, with two drams of ointment, was performed on the 13th of July.

14th, 15th, 16th, and 17th. The like quantities were applied every evening after bathing.

18th, and 19th. Frictions omitted; baths continued.

20th, and 21st. Frictions, with three drams of the ointment; also the baths repeated, the throat somewhat sore.

22d, and 23d. Baths and frictions continued; the patient observing that the mineral water, of which she drank six large glasses every morning, and three every evening, diminished the soreness of her throat, clysters of the hot water were added.

24th. Bath and friction omitted.

25th.

25th. Both likewise deferred: the patient sweated greatly all that night.

26th, and 27th. Re-assumed the baths and frictions, with three drams of the ointment; no remainder of the sore throat.

The head-ach, with other symptoms attending the distemper, for the most part vanished, and natural rest restored.

28th. Bath and friction with four drams of ointment.

29th, 30th, and 31st. Both omitted.

August 1st, 2d, 3d, and 4th. Baths followed by frictions of four drams each.

5th, and 6th. Baths continued; ointment omitted.

7th, and 8th. Baths and frictions repeated.

Observing now that the lady made no sort of complaint, and that she had recovered the appearances of perfect health, I left her during eight days to her regimen, with a bath every second day: afterwards she was purged three times, in the space of a week, with *manna*.

It is to be noticed, that from the seventh friction to the end, she had a constant flow of perspiration, with copious evacuations by urine; effects of the salutary co-operation of these waters with the mercury.

During the whole course she took milk or cream, mornings and evenings, as well as at night, and dined on soup, chicken, veal, or other like food.

She changed her linen as often as she pleased, dressed every day, and saw company, so that no person could have imagined her situation, if she had not published it, by often expressing her satisfaction at the easy progress of her cure.

Thirty-fourth Practical Observation.

A surgeon's apprentice, who was manually employed at *Bareges* for the mercurial frictions, undertook to cure a woman of the venereal disease, without regard to the weakness of her constitution, or considering that she could not well bear the operation of mercury, because she had often before undergone it; which it is important to mind.

He proceeded in the manner he had seen practised in circumstances quite different, and moreover omitted to give the mineral water for drink; so that his patient fell into a high salivation, after the fourth friction.

Surprised and frightened, he informed me thereof. I ordered the unctions to be immediately suspended; clysters of the hottest source to be frequently administered; the same mixed with milk to be plentifully drank; and the patient to be kept warm in bed.

The discharges by urine and perspiration became very abundant; the spitting diminished apace; insomuch that, after five days, she re-

assumed the baths, with the frictions; and continuing the internal use of the waters, with a milk-diet, the whole succeeded so well, that she bore thirteen anointings, some of two, others of three drams, without further accident, and was perfectly cured.

C H A P. V.

*Of the Rheumatism and Palsy, with
practical Observations.*

THE immediate cause of all or most rheumatisms, is an imperfect transpiration; and their seat is in the membranous tunic which covers our muscles.

For remedying such obstructions, nothing can excel these waters, even in the most difficult cases; as when they are of a long standing, and the skin thick, strong, and rigid: for by soaking in the temperate bath, it's texture is gradually relaxed, the excretory ducts are widened; the morbid matter is liquefied; and by adding their internal use, every disposition is communicated to the fluids, as well as the solids, for receiving with advantage the hot *douche*, with it's expulsive impressions.

It is to be observed, that when a rheumatism is recent, and the cause still fluctuating, a cure may be safely attempted, and directly obtained, by employing this powerful agent the *douche*, which, by exciting a flow of perspiration, is able to drive out the fizy humour, as it were by an immediate crisis.

But it is very important to judge of this point rightly: for if the inspissation be fixed, so as
not

not to yield, then the percussion of the hot water serves only to raise a ferment, to dissipate what fluid there is, and to augment the degree of the distemper.

By the neglect of such rational reflections, or the want of due skill, many have missed opportunities of speedy redress, or suffered cruel disappointments in their expectations.

Thirty-fifth Practical Observation.

One of the King of *France's* huntsmen, being afflicted with a general rheumatism, which had resisted the usual remedies, was sent from *Versailles* to these waters for relief.

It particularly attacked his loins, to such a degree that the body remained quite bent; and at times he endured exquisite pains. After a month's daily use of the temperate bath, and constant drinking of the hot source, the parts being rendered pliant, he began to raise his head.

The *douche* becoming then proper, was applied constantly at coming out of the bath, which is the advantageous moment for its operation; and thus he was entirely cured by the end of the season.

Thirty-sixth Practical Observation.

A lady of *Thoulouse*, aged about sixty, who had lived in a convent during twenty years, laboured

laboured most of that time under a rheumatism, which was deemed gouty.

Her arms, legs, hands, and feet, suffered great tortures, and the disease often invaded her stomach, as well as her head. I saw her freed of all these complaints, after six weeks, by the Bath and *Douche*.

Palsies produced by impeded perspiration, or begot by intemperance, come successfully under the influence of these waters; especially when in dry bilious bodies bereft of nature's balsam; as it is easy to conceive, by comparing the indications in such cases, with their diluting, oily, animating virtues.

Thirty-seventh Practical Observation.

An officer, inhabitant of *Perpignan*, aged about fifty, had some years before been obliged to quit the military service, because of a weakness in his limbs, which he attributed to fatigues, and an irregular way of living.

At the time he was carried to *Bareges*, his left leg and arm, being much wasted, were destitute of all motion, and the right tottered extremely.

By a due application of the waters, he was, in six weeks, enabled to go with crutches; and at the end of the season, he needed only a cane to walk with.

Thirty-eighth Practical Observation.

An aged gentlewoman, of the country near *Caen*, in *Normandy*, whose constitution had been impaired by keeping late hours, was seized with an *Hemiplegia*, or palsy of half the body.

The immediate cause was judged to be a stoppage of perspiration, from the patient's having slept in a cool place, when over-heated; but circumstances sufficiently shewed there had been a previous disposition. However, she being carried to *Bareges*, three months after the attack, was not only cured of the nervous disorder, but her constitution was retrieved to a wonderful degree.

I have observed in paralytic cases, that the legs recover strength and action more readily than the arms; probably because the blood and spirits flow with greater facility to the inferior than to the superior extremities.

In the *Pyrenean* mountains, as in other countries abounding with snow, the inhabitants are subject to have a numbness left in parts which the cold had nipt, whereby they became, as it were paralytic.

Those in the neighbourhood of *Bareges*, when such accidents happen, wait with confidence the season of going thither: for in five or six days they are generally cured by the hot *Douche*.

Thirty-ninth Practical Observation.

A peasant, on his arrival at *Bareges*, shewed me his hand, which had been frost-bit three months before ; it resembled a dead part, without heat, motion, or sensation. I directed him to steep it an hour, morning and evening, in the water of the hottest source, and to apply it immediately after to the *Douche*. Returning to me the third day, his first salute was a hard squeeze, to shew that he was perfectly cured : the part had entirely recovered its natural colour and strength.

It is to be observed, that, when palsies proceed directly from relaxation of the fibres, and from congestions of phlegmatic cold humours, which bloat the body, and clog the vital springs, *Bareges*-waters are not in such cases to be meddled with ; but in their stead, those of *Balleruc*, the most strengthening of any yet known, are highly appropriated.

I have seen surprising success from them, against apoplectic disorders, in the short space of fifteen days.

Taken inwardly they scour the bowels, and evacuate copiously ; applied in the way of Bath and *Douche*, they brace up the fibres, and restore the elastic tone ; effects plainly analogous to those of sea-water, and doubtless owing to the marine salt wherewith they abound, joined to the vitriolic acid of a sulphureous spring.

C. H. A. P.

C H A P. VI.

*Of the Gout, Gravel, and Stone ;
with practical Observations.*

TH E S E diseases come naturally under the same head, as they often afflict the same persons ; and, bearing a near affinity, frequently degenerate the one into the other.

Their material cause is apparently the same, *viz.* a redundancy of a saline, viscid humour, which, according to it's consistence, and the parts it falls on, produces one of these cruel distempers.

By the gout's inflammatory fits, the tendons, capsules, and ligaments become dry and contracted ; nay, concretions often fill the articulations, so as to impede all motion.

In such a state it is obvious how effectual a topic *Bareges-Baths* must prove ; and if drank at the same time, the most happy effects must attend so penetrating a dissolvent, so powerful a promoter of perspiration, that most salutary discharge, no less essential to the preservation of health, than to the cure of diseases.

I am persuaded that a due perseverance in the internal as well as external use of these waters, would extirpate the principles of any
gout,

gout, and redress all injuries produced by it; especially if assisted by a milk-diet, to correct and sweeten the juices.

Fortieth Practical Observation.

A gentleman of *Martinico*, many years the victim of a most outrageous gout, was encouraged by the fame of *Barrages*, to undertake the long voyage thither, in quest of relief.

The tendons, as well as ligamentous parts of his feet were become quite stiff, and the joints void of motion; moreover his legs and knees were greatly swelled, and exquisite pains often attacked his bowels, head, shoulders, and arms.

The temperate and hot Baths, with *Douches*, were administered in their due turns: besides which he drank every morning a bottle and half of the water, with milk, both drawn in the instant of taking them, and consequently possessed of all their precious balsam; a mixture to which no medicine can be superior, in answering indications like those of the present case.

His food was cream, or milk, with bread; except that at times he eat a wing of a chicken; and his common drink was the mineral spring.

Thus I saw him cured, in the space of two months, and so perfectly as to walk up and down the mountains.

The

The virtues of these waters against the gravel are very conspicuous.

By Bath they soon relieve the nephritic pains, and taken inwardly they extinguish the heat and acrimony of the urine, dissolve obstructing viscidities and concretions, and like a gentle tide wash away the whole, without difficulty.

Forty-first Practical Observation.

An ecclesiastic of *Thoulouse*, who had been in a desperate situation, for a series of years, was at length carried to *Bareges*.

The irritation in his urinary passages was so constant and great, that he was seldom able to move a step in his room, without losing blood.

By temperate Baths, drinking copiously of the hot source, and repeated clysters of the same, which served to foment, lubricate, and soothe the bowels, I was witness to his walking the street with ease in a few days, and of his being thoroughly cured before the season ended, having had considerable evacuations of slimy matter, gravel, and small stones.

After all we have seen of these excellent waters, we come now to the view of a still greater wonder, their power of dissolving the stone in the bladder.

Doctor *Dessault* conceived such an idea of their powers against this rebellious concretion, from

from what he had observed of their virtues in many * analogous diseases, that he quitted his great practice at *Bordeaux*, and employed some time at *Bereges* in making experiments and observations. He afterwards published a learned dissertation†, and therein gives all desirable satisfaction in this important matter.

The stone, he says, is generated by superabundant salts in the urine, joined and incorporated by the mucus of the bladder; and, as chemistry evinces ‡ sulphureous dissolvents to be the only proper ones for the solution of sulphureous bodies, he concludes that *Bareges*-waters must be effectual against the stone, because their volatile oil is adapted to penetrate and break through it's glutinous parts, while the aqueous *Menstruum*, being the natural one for salts, dilutes and sets them free from all cohesion.

* Mais quels heureux Succés cette Eau ne produit elle pas, dans des Tumeurs que nous avons fait voir analogues a la Pierre, Glandes au Sein du Sexe, Tumeurs ecrouelleuses, Obstructions du Foye, de la Ratte, de la Matrice, Anchiloses, Nodosités, dans les Articles des Goutteux, Callosités fondues dans les Muscles releveurs de la Machoire qui empechoient d'ouvrir la Bouche, & qui avoient succedé a une copieuse & abondante Salivation. J'ai vu tous ces Miracles operés par les Eaux de *Bareges*. Vid. Dissertation sur la Pierre, p. 155. par *Dessault*.

† Vide La dissertation sur la Pierre.

‡ Vide *Willis*, cap. 9. de dissolutione corporum libro de Fermentatione.

Having

Having illustrated his subject with learned reasoning and sound theory, he proceeds to the authority of experiments and practice.

A *Calculus* †, or stone, weighing near three ounces, which he laid to macerate in the water of the hottest source, named *Le Grand Bain*, was in four days diminished an eighth part; in four days more a fourth; and thence it quickly yielded to a total dissolution.

He cites the || case of a friar at *Bareges* in his time, who had a stone in the bladder, verified beyond all doubt, and was to his certain knowledge perfectly cured in one season, by drinking the waters there.

Such a testimony, from a man of Dr. *Dessault*'s credit and character, merits general confidence. I have not had any adequate instance, in my own experience, of this matter, and can therefore only join the following reflections.

That *Bareges*-waters may, in reason, be deemed equal to the great effects which our author attributes to them, because of their known sovereign * virtues against *Callosities*, *Nodes*, *Schirruses*, and all indurated tumours.

They have an affinity of principles with medicines the most approved, for relief against the stone, as also for dissolving it; and they surely

† Vide p. 226. De sa Dissertation sur la Pierre.

|| Idem, pag. 229.

* Vide chap. II. Part II.

excell them in the nature of their preparation.

Manna, whose palliating effects the great Dr. *Sydenham* * experienced, for a stone in his kidney, with such advantage as to continue free from torture during nine years, by using it at times, is an inspissated vegetable oil, together with an essential salt, from the *Calabrian Fraxinus*, or ash tree; but the exalted balsam, and volatile salt, which we behold in these mineral sources, seconded by their benign warmth, admit surely of no comparison, in point of mol-
lifying, penetrating, and dissolvent faculties.

The celebrated specific of Mrs. *Stephens*, to do it the greatest honour, can be regarded only as an analogical inferior medicine to these waters: being composed of soap and calcined ingredients, it truly forms a softening, deterfive, and diuretic medicine; but the salutary bitumen and salt of our waters answer these indications with an evident superiority; for, without drawing any parallel between the oleaginous parts, the salts of the former, both testaceous and vegetable, are alkalies fixed by the violence of fire, and consequently are pungent and heating; whereas those of the latter, a volatile acid and alkali joined, being nature's produce, are mild and gentle in their operations.

* De mictu sanguineo, a calculo renibus impacto.

The difference appears every way in favour of *Bareges*-waters, and the more so as volatile salts are known to be the most ready dissolvents of urinary inspissations or concretions.

Moreover, let us consider the further merit of these mineral springs, by their being capable of removing, at the same time with the stone, sundry diseases often afflicting the same body; an advantage not to be expected from other dissolvents.

1. Their excellence is shewn for correcting the acrid viscosity of the blood; source of most distempers, and probably of the stone itself.

2. Their efficacy is apparent against the rheumatism and gout, diseases nearly related to the stone, frequently it's associates, and which doubtless furnish matter to it's accretion.

3. Their vulnerary influence easily reaches the bladder, to heal the ulcerations, and redress other injuries, often occasioned by the stone: a mighty point, even though the patient were afterwards to undergo the operation of *Lithotomy*, or being cut.

4. No medicine, yet in credit against this dreadful malady, can be given for a continuance of time, with so little disgust as these waters; since they may be used for common drink, and never burthen the stomach, though taken in large quantities, but light as air pass freely, and become acceptable to the taste.

5. They admit of more ways of being administered than other dissolvents, since they may, without inconvenience, be daily repeated by drinking, bathing, *douching*, injections, and glysters, which greatly augment their powers ; for all these means united prove mutual assistants to each other, in attacking the evil and it's causes more vigorously.

I do not mean to diminish in the least the merit of Mrs. *Stephens's* medicine, nor dispute the examples of it's success : the assertions of great physicians and surgeons, in *London*, as well as at *Paris*, are sufficient vouchers, and the extraordinary recompence, granted her by the representatives of this generous nation, truly dignify it. It is at least constantly observed, that it relieves the tormenting pains attending the stone ; probably by the most subtle parts of it's soap reaching the bladder, supplying it's abraded *Mucus*, and defending it's delicate nervous cavity against the acrimony of the urine, and impressions of the contained concretion.

I only intend, upon the authority of Dr. *Dessault's* experiments and practice, to give a comparative view of the excellence of *Bareges-waters*, and their superior advantages, thereby to encourage the distressed to have recourse to so promising and easy a remedy, which is equally beneficial to persons of every * age,

* Mrs. *Stephens's* medicine is reputed more effectual for old, than for young persons.

and,

and, if properly managed, is incapable of any ill consequences, nay, cannot fail of producing good ones. According to the virtues ascribed to Mrs. *Stephens's* dissolvent, it should prove efficacious against indurated tumours, since they are analogous to the stone, and the component cause of both is the same, *viz.* a lymphatic inspissated matter, fixed by salts. Finally, considering the extreme difficulty and tediousness of dividing this urinary concretion, might it not be expedient to join the use of the soap-medicine with the mineral fluid? Both might form a dissolvent, as complete, certain, and speedy as possible.

How advantageous a vehicle must *Bareges-water* prove, for conveying the gross oil and salts of the other, as their warmth and volatile balsam would surely impart a spirit and action capable of the greatest success?

and a properly managed, it is the only way
to secure the future of the country. A
good deal of money has been spent in
the past, but it has not been wisely
expended. The government has not been
able to keep its accounts straight, and
it has not been able to pay its debts.
The people have been misled, and the
country has been ruined. The only way
to save the country is to reform the
government, and to pay the debts.
The people must be educated, and
the government must be reformed.
The only way to do this is to elect
good men to office, and to give them
the power to do what is right.

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OF THE
INTERNAL DISTEMPERS
CURED BY
BAREGES-WATERS;
WITH
PRACTICAL OBSERVATIONS.



THE UNIVERSITY OF CHICAGO

1910

INTERNATIONAL DISTANCE

STUDY

BARRETT-JAMES

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PART III.

CHAP. I.

*Of the Internal Distempers cured by
BAREGES-Waters ; with practical
Observations.*

UNDER the appellation of internal distempers I rank such as do not belong to the surface of our bodies, are not subject to manual application, and are chiefly or only accessible to medicines by the ways of circulation.

The difference in fact, as well as in point of cure, between these and external diseases, depends on the more delicate texture of our internal parts, the many dangers attending their great sensibility, the importance of their functions, and above all, on the difficulty of finding remedies fitted to enter safely the most remote and intricate recesses : for the nature of both is absolutely one and the same :

obstructions, imposthumes, wounds, ulcers, indurated tumours, with the whole class of such diseases, are alike wherever they reside: therefore a remedy capable of curing them externally, cannot in general fail of success internally, provided it's powers can reach the seat of the evil.

Surely *Bareges*-waters appear equal to this task; since we have seen them penetrate thro' glands, tendons, ligaments, and even the very bones, to exercise their virtues against most rebellious and obstinate maladies of various kinds.

Few indeed but external disorders were heretofore deemed proper objects of their salutary influence; but analogical reasoning hath happily taught us to extend their advantages, and constant experience confirms us in the satisfaction of having judged rightly.

There need now but few illustrations of their principles and effects: enough hath been said on various occasions in the preceding parts of this work; all of which is alike relative to the present.

They certainly form a perfect medicine in that grievous situation, which is termed a bad habit of body; that is, where the solids and fluids are in such a state as to be unfit for the due functions of nature: If the distemper be not gone too far, they are capable of opening the ways of circulation, and of rescuing life amidst it's greatest distresses.

What

What a happy resource is here, for the numbers whose constitutions are impaired by irregularities and intemperance! These waters, duly drunk with milk, correct the impurities, renew the mass of fluids, replenish it with nutritive balsam, regulate the tone of the solids, and restore in both that beneficial correspondence mutually essential to their welfare.

During the first season of my being at *Bareges*, I made trial of these liquids in conjunction, and found them most salutary on sundry occasions.

The proportion of milk is to be according to the nature of the case, a fourth, third, or half, mixed with the hottest water, and to be drunk at the source, leaving intervals of fifteen or twenty minutes between each glass.

In this manner a proper quantity of milk necessarily proves easier of concoction, and of a readier distribution, than if taken pure and at once, before or after the waters; for, by being blended immediately with them, it is rendered partner of their great levity, as well as of their social warmth; and by being given in portions, it also acquires every advantage towards reaching the most minute remote vessels, without the risk of clogging any of the passages, which otherwise frequently happens to valetudinarians.

Certainly no ass's milk, nor any other, can, in consumptive cases, be so restorative and healing as this balsamic emulsion.

Forty-

Forty-second Practical Observation.

A gentleman of *Toulouse* aged about forty, reduced to the lowest ebb of health by long continued excesses of intemperance, was sent to *Bareges*, with the single view of obtaining a little ease by the baths, from the inward hæmorrhoidal pains, which in particular rendered his Being miserable, without any further hope, as his situation appeared too desperate, and had already frustrated many attempts for relief.

His stomach was incapable of digesting, or even bearing any solid food, and his head was constantly confused with a loss of memory: frequent seminal weaknesses, a trembling so constant that he could not handle a pen, anxiety, extreme leanness, with a fallow dismal complexion, too plainly characterized the decay of nature.

I prevailed upon him to begin by drinking the water of the hottest source mixed with milk, in equal quantities, and to adopt thin fresh cream for his only nourishment.

After a few days he began to taste the sweets of rest; and at the end of fifteen, felt a remarkable good change in his constitution. Then I agreed to the use of the temperate baths, with frequent half-clysters of the hottest bath water; by all which means his hæmorrhoidal complaints were removed, the whole habit of the body was opened, received a bal-
famic

famic nutritious juice, and strength gradually ensued; so that in the space of six weeks, this former shadow, as I may say, of a man, was restored to all his functions.

How such wonderful effects are produced is very intelligible to those who, having a knowledge of the animal œconomy, can conceive by what ways a vehicle so medicinal as *Bareges-water*, with a food so balsamic as milk, are capable of imparting refreshment, suppleness, elasticity, action and vigour, to all the fibrous springs of life.

Here is then a prospect of most hopeful resource, not only for the many, who by fast living, but for those also, who by the influence of hot climates, or exhausting distempers, are become dry, withered, and sapless; or, as it is well expressed, grown old before their time; for whatever be the cause of over-contracting, straitening, and lessening the due diameters of our vessels, the cases become truly analogous to that of old age, with it's train of infirmities.

And even this last irremediable disease, as far as it can be susceptible of comfort, or of respite from its fatal catastrophe, may surely expect relief in these liquids, of all others the most circulative, benign, restorative, and correspondent † to our nature, whereof I shall give two satisfactory examples.

† Vide chap. V. Part I. of this treatise.

It were to be wished, for the sake of those who cannot go to drink *Barèges*-waters at the spring, that a method could be found of conveying them, without the dissipation and loss of their spirituous and most essential particles. They are often sent in flasks or bottles to *Paris*, as well as to several other places: but the virtues they retain bear little comparison with the powers they display at the fountain-head; and the common error of warming alters them still more than the carriage; because, as has been said *, the order of motion, communicated by common fire, appears of a different kind from what actuates them in the source, and is even destructive of their nature.

It appears therefore better to commit them directly to the analogous warmth of the stomach; or if it be a case wherein the use of milk is indicated, to mix in each glass of the mineral water the due portion thereof, drawn from the animal at the instant of drinking it; as a means to revive it's temperature as near as possible, and of rendering it agreeable to the most delicate constitutions.

Forty-third Practical Observation.

Monfieur *De Beaujat*, a gentleman of *Toulouse*, aged about ninety-seven, induced by

* Vide chap. V. Part I.

what he had heard of persons carried cripples to *Bareges*, who returned with the use of their limbs, got himself conveyed thither, without considering the discouraging circumstances, and the great disadvantage of his years : so partial is nature in her own cause, and prone to flattering hope.

Scarce capable of being propped by crutches, because from a necessary consequence of nutrition, the conduits of life were hastening to close, and the ligaments as well as tendons, with all the constitutional parts, were becoming arid and inflexible, so that the term approached, at which the mechanical powers of the body cease to act, and which is justly to be called the natural period of our Being ; he nevertheless confidently applied himself to a course of the temperate baths : I added the internal use of the hot water mixed with milk, which he continued with such success, that every day he acquired some degree of motion, as well as of spirits ; till at the end of five weeks I saw him walk alone by the help of a cane : such is the influence of these fluids, which so effectually open and enter the absorbent pores, and dilute the stagnating juices in the smallest vessels, at which it may be thought too difficult for them to arrive by other ways, in such a body ; so prodigious, I say, are the virtues of this mineral balsamic water, which at the same time anoints every fibre, supple the whole animal texture,

texture, and revives the almost stagnating circulation in the most remote decaying parts.

Nor can all this, though very extraordinary, prove difficult of belief to those, who observe what hath been before set forth of effects analogous to these.

Forty-fourth Practical Observation.

A General officer of artillery, an inhabitant of *Perpignan*, came to *Bareges* for the cure of stiffness, pains, and want of motion in his limbs; the sad result of ninety-six years of age, mostly spent in military services, and to which some old cicatrices likewise contributed.

A month's use of the temperate bath, with a few hot *douches*, and drinking the waters with milk, set him so tolerably well on his legs, that he went away quite happy, and in a way of living so, as long as his years might admit of.

Congestions of phlegm, depraved juices in the stomach, which perpetuate indigestions, reachings, flatulency, vapors, with a train of other attending evils, are removed by these waters, by their cleansing the glands, and rectifying the secretions.

Forty-fifth Practical Observation.

A Lady afflicted during twelve months, in the grievous manner aforesaid, whose distemper had resisted the judicious endeavours of some of the best physicians of *London*, was sent to *Bareges*, where, by constantly drinking the hottest water, mornings and evenings, as well as at meals, she in a week's time got rid of her vomiting, and other complaints: her appetite became afterwards good; all sorts of nourishment agreed with her; and what is worthy of notice, she fed plentifully, and with benefit, on milk, and cream too; though her stomach had never before been capable of digesting either.

Forty-sixth Practical Observation.

A Lady of the city of *Pau* in *Bearne*, had her stomach long infested with a sourness, which perverted all it's functions, and reduced her to a very languid state.

It was so violent as to excite frequent reachings, and often to excoriate both her throat and mouth: yet a month's use of *Bareges*-waters performed an entire cure.

Cholics, frequent attendants on weak or distempered constitutions, proceed either from the imperfect digestion of aliments in the
M stomach,

stomach, and first ways, the seats of their putrefaction; from the stoppage of some natural evacuation, whose excrementitious matter falls thereon; or from an insufficient preparation of the animal fluids, in the circulating vessels and glands: for when they have not, by means of those organs of a second digestion, as I may call them, received the necessary elaborations for due distribution and excretion, they lurk in those repositories with their viscosity and acrimony, till they are by intervals thrown into the bowels, as into a common sewer, and there exercise the most cruel violence.

These disorders, with their principles, are surely removeable by drinking *Bareges*-waters: if viscous, they are easily dissolved; if bilious, they are diluted; and if there be the aggravating complication of wind, in consequence of irritation in the parts, it is soon relieved: for I have often observed that the first or second glass of this liquid quells pains of the stomach and belly: so quickly anodyne are its powers.

Further, when a cholic depends on a more obstinate cause, as the nephritic, here are the greatest resources to be had, by uniting whole or half baths of the temperate source, and the lenitive help of clysters of the hot, with the internal use of the latter: means certain for helping of pains, widening the passages, facilitating the emission of gravelly matter, and even effecting its dissolution.

And

And truly cholics, of whatever nature they be, must find relief in such joint assistants, by their relaxing the bowels and loosening the impacted humours.

Nothing is plainer, than that they are likewise appropriated to remove obstructions of the mesenteric glands, which often afflict persons subject to cholics.

Forty-seventh Practical Observation.

A Magistrate of *Bourdeaux*, grievously afflicted with nephritic cholics, was totally cured, after ten weeks stay at *Bareges*.

In the moments of his greatest sufferings, he received immediate relief from the temperate baths, and always felt very sensible advantages from clysters of the hottest source.

During his second month he continued to void quantities of slime, with gravel stones, some of which were as large as lentils.

Forty-eighth Practical Observation.

A Gentleman of *Marseilles* found redress in temperate baths, clysters, and the internal use of these balsamic springs, against the torments of a bilious cholic, complicated with much wind, whose attacks were so many trials for life, being often so violent as to produce convulsions.

Forty-ninth Practical Observation.

A Lady from *Austria*, rendered unhappy by cholics, during five years that her monthly courses were deranged, and exhausted all that time by a constancy of that wasting evacuation, called the whites, was perfectly cured by the internal use of these waters, and the temperate baths, succeeded by some *douches* of the hottest.

Here again we behold the great obligations which the sex owe to these waters; and with-all, their success against that very general disorder, named hysterics, is most interesting; for they efface it's various and cruel effects on the body, as well as mind, by composing and regulating the inordinate nervous vibrations, and they carry off the latent cause, by freeing certain glands from a stagnating acrid lymph, of which in such cases they are repositories.

Fiftieth Practical Observation.

A Clergyman of *Comminges* had been, for some years, the victim of frequently returning cholics; though in the prime of life, and formed strong, he was become wan, meagre, and feeble. Depraved appetite, eructations of a bad flavour, and frequent vomitings, were the
conco-

concomitants of his state: besides which, he was generally every winter worried by irregular intermittent fevers.

Emetics, purgatives, decoctions of depurating plants, stomachics, and febrifuges, had been in their turns administered to little purpose; for the principal cause remained inherent, because none of these medicines had reached as far as to scour sufficiently the meanders of the glands, to correct the digestive ferment, and to create new beneficent juices; all necessary changes.

This task was reserved for *Bareges*-waters, which, in seven weeks, produced every wish'd-for effect, and restored the patient to the enjoyment of health.

It is true, that during the last twenty days, in order to accelerate the cure, I added the use of *Castile* soap pills, an excellent aperitive in such cases; and moreover, the patient was purged at times, as the redundancy of dissolved, detached, floating humours appeared to require: for though the virtues of these waters be great, it is not to be imagined that the aid of analogous medicines, or those subservient to their success, are excluded; the important point is to judge rightly of their appropriation or need, and to time the applications.

In considering the nature of the disease known by the name of Dry-gripes, common in the warm *American* colonies, it appears that none can come more properly than it, under

the influence of these waters; it's dreadful *vestigia*, dried bowels, contracted members, and tottering limbs, would undoubtedly, if taken in due time, be effaced by their refreshing lubricating virtues.

This, I say, is an agreeable prospect for those who, in quest of wealth or honour, have been parched in torrid climes: let such go with confidence to *Bareges*.

I am persuaded that the due application of it's salutiferous springs, with an exact diet of milk and cream, cannot fail, in one season, to supple the most shrivelled nerves and membranes, to dilate the vessels, and, as far as possible, renew the most withered constitutions.

I am likewise of opinion, that cholics, numbness, and palsies, to which colour-men and their grinders, house-painters, and many miners are subject, in consequence of arsenical vapours stimulating their solids, would find a sovereign remedy in these waters, which serve not only to sooth the parts, but to sheath and wash away the irritating asperities; and, by the operation of the hot bath and *douche*, effectually to expel, by perspiration, whatever is noxious; for they evidently possess every property of a powerful diaphoretic, and even of alexipharmics; witness the following remarkable case.

Fifty-first Practical Observation.

A peasant cutting wood on a mountain near Bareges, being bare-footed, was bit near the instep by a viper.

In four hours after, when I saw him, the spot was vastly inflamed, livid, and a swelling with a painful tension reached as high as the knee; so that a wide stocking, which covered his leg, could not be pulled off without cutting.

I quickly ordered the part around the bite to be well cauterized, by burning gun-powder on it, and also had it scarified; but all this came too late: for not only the swelling and pain encreased and gained the thigh, but the man grew very sick, and was seized with a violent cholic.

The country affording no ready choice of medicines, I resolved to try the effects of the hottest bath-water, of which I conceived a great opinion in the present circumstances; and accordingly the patient, being laid in a warm bed, I ordered copious draughts thereof to be given him.

After he had drank six pots, which are equal to three gallons, in twenty-four hours, and therewith sweated prodigiously, his pains every where began to lessen.

The evacuation by the pores continuing, all the symptoms vanished; so that on the third

day he was well, and walked about, to the surprize of every body at *Bareges*.

I leave it to the dicision of the judicious, if the poison does not, in this case, appear to have been communicated to the mass of blood, and expelled by the sudorific effects of this bituminous water.

There is no distemper in which these aperitive sources prove more effectual than in the *Jaundice*, by freeing the glandular conduits, dividing the resinous bile, for which their oily principle renders them particularly apt, and by breaking through the indurations, which in that state frequently possess the liver; sure causes of succeeding dropsies.

Fifty-second Practical Observation.

Monfieur *Fort*, of *Bordeaux*, had tried a variety of medicines, and mineral waters, for the cure of a *Jaundice*, which constantly recurred, because the obstructions of the liver had not been radically removed.

When he came to *Bareges*, his distemper was come to such a height, that he was all over of a deep yellow colour, and his linen acquired every day the same tinge.

After a month's internal use of the hot source, and some temperate baths, I saw him entirely cured.

Fifty-third Practical Observation.

A curate of *Perigord*, aged about fifty years, distempered to the degree commonly called a *Black Jaundice*, with a hard tumour in the liver, quite perceptible to the touch, was entirely cured at *Bareges* in nine weeks.

The same powers are equally capable of pervading and cleansing all the recesses of the body, where congested or foul humours are harboured.

I have seen many examples of quick relief by them, particularly in cases of the nose, jaws, and throat; all naturally abounding with pituitous glands, and consequently subject to frequent stuffings, and injuries, from a disposition in the blood, from a vitiated acid quality in the spittle, or sharpness of air; and, above all, from the noxious preparation of tobacco-snuff; a sternutatory, to which fashion gives a beginning, and habit an inordinate continuance; for nature, surely, entailed no such incessant want on the sense of smelling.

A rational use of this powder, fairly prepared, would prove salutary; but its present abuse is certainly attended with very great evils.

The humour, drawn by it's irritation to the nasal glands, is by it's perpetual repetitions, and the ensuing contractions of the ducts, necessarily repelled so as to suffer greatly in the
liberty

liberty of excretion, which snuff-takers may easily verify ; for by abstaining for certain intervals, they will perceive how much more concocted and free the mucous evacuation will then be, and clearly see why it was before serous and scanty, with dry foul nostrils.

Such a derangement kept up in the emission of this excrementitious matter, inevitably distributes disorders to neighbouring parts, whence, as well as from swallowing particles of the tobacco, probably often proceed guttural coughs, phlegmatic spittings, morning-reachings, with subverted digestions ; and, what is most frightful, apoplexies, so common in our days, may be justly suspected of being oftentimes imputable to its pernicious influence.

How can a constant titillation, or fretting of nerves, so superficially situated and thinly covered, so near the origin of sensation, and connected with numberless others, as the olfactory are, besides injuring the organ itself, fail of spreading impressions repugnant to the whole animal œconomy, and particularly prejudicial to the sight and memory, productive of tremblings, vapours, dizziness, and other disorders, which deluded admirers of snuff are not aware of, or will not attend to, though enough has been written to apprize them, and sufficient examples appear to convince the most incredulous.

What serves evidently to prove how far the wellicating effects of this powder extend, is it's
being

being an accessory to drunkenness, in constitutions of a certain sensibility; that is, it makes them feel more suddenly the effects of spirituous or fermented liquors: and this observation clearly shews that ebriety proceeds from immediate impressions communicated to the nervous texture of the stomach, according to it's various tones, and not from fumes transmitted to the head, as is vulgarly imagined.

But this is not a place to pursue any subject further than it relates to *Bareges*-waters; and to conclude, with regard to their virtues of smoothing and regulating the tone of the nerves, they undoubtedly appear capable of rendering all possible service in such respects.

I will moreover add, that the baths, by detarging and radically cleansing the pituitous membrane of the nose, and the maxillary sinuses, promise fairly for effacing that nauseous taint, named stinking breath, as often as it depends on a foulness residing in the glands of those parts.

We now proceed to exalt the merits of these waters, by cures of the most interesting of diseases, the *Asthma*.

It's different species yield so certainly thereto, that I saw none resist them: nor is it surprising, after what we have seen of their penetrating, opening, mollifying effects, that they should dissolve the inspissations and tubercles,
which

which choak and obstruct, and likewise efface the spasms, which derange the tender contents of the breast: but it is to be noticed, that the temperate source, which in principles and degrees of heat corresponds very nearly to the famous fountain, named *La Ralliere*, at *Cauterex* *, proves, in general, the best adapted to this disorder, because of the delicate texture of the lungs; however, some glasses of the hottest are at times proper, in order to second and excite the action of the other.

Fifty-fourth Practical Observation.

Father *Barnabé*, a capuchin of † *Condom*, had been for many years afflicted with a humid *Asthma*, attended by a constant wasting, and spitting of serous phlegm, which encreased to such a degree, that for four years, successively, he had been deprived of the pleasure of lying down or sleeping in a bed.

After drinking the temperate bath-water fifteen days, he began to expectorate with some freedom, and to find an ease in breathing; which went on so successfully, that in a month he was capable of sleeping reclined on a double pillow.

* A place distant from *Bareges* about three leagues, and separated from its valley by a mountain; it abounds in mineral sources, much like those of *Bareges*, and in just vogue for disorders of the breast.

† A town on the river *Garonne*.

Then some glasses of the warmest source were, at times, added to the temperate, which he still continued, morning and evening as well as at meals.

He was, at due intervals, purged with moderate doses of tobacco-syrup, and the evacuations succeeding to our wish, plainly exhibited dissolutions of the morbid matter, which had filled and distended the pulmonary vessels.

At the end of ten weeks the patient went home, perfectly freed from his distemper.

Fifty-fifth Practical Observation.

An *English* watch-maker, aged about thirty-six years, passing by *Bayonne*, in his way from *Spain*, was advised to try *Bareges*-waters, for an oppression and shortness of breath, with little or no expectoration, which had grievously afflicted him during eight years, and determined him to fly from the climate of *Madrid* to that of *London*: so restless is nature when disordered.

Being arrived at this sanctuary of health, as I may justly term *Bareges*, he began by using the temperate water for some time, and spit a viscid phlegm mixed with a gritty matter; which evacuation went on for five weeks, to his great relief: but at the end thereof his fits of coughing growing more violent than before, he frequently brought up small hard stones, in the whole to the weight of two drachms

drachms and one scruple; productions, however, not so extraordinary as some may think, since like concretions, of various sizes, may be formed in every part of the human body, as many dreadful instances, taken notice of by writers, sufficiently evince.

After this, I had him purged several times with manna dissolved in clarified whey, still keeping him to drink the bath-waters; till, by three months use thereof, he got quite rid of his complaints, and returned with satisfaction to his settlement in *Spain*.

Fifty-sixth Practical Observation.

Father *France*, a Jesuit of *Thoulouse*, had laboured during thirty years under a convulsive *Asthma*.

His paroxysms were frequent, with such violent suffocations, that it was often apprehended every gasp and painful sigh would be his last.

All the most appropriated and usual medicines had been tried with little or no advantage; for his misery lasted till the lucky moment of his recourse to *Bareges*, where the temperate source alone restored him to perfect health in the space of one season.

To pursue the practical history of these medicinal springs would be an endless work; for every season would furnish volumes.

The cures here set forth are selected out of the vast number of which I was witness, to
serve

serve as instructive examples of the cases in which their virtues may be depended on; and I hope that these, with the experiments, explications, and reflections annexed, may suffice to establish a proper notion of *Bareges*-baths and waters, which may justly be esteemed among the most valuable gifts of providence for human relief; and to demonstrate what I advanced in the beginning of this essay, that they prove adequate to the most general indications in physic.

GENERAL



GENERAL RULES, *with* Remarks, *for*
the Use of BAREGES-Baths *and* Wa-
 ters.

IT would not answer any good purpose. Should I here attempt to lay down precise directions for the manner of proceeding in each disorder or case; because a variety of occurring circumstances, and the difference of constitutions, require being particularly known, nicely distinguished, comparatively considered, and judged of, in order to guide every application of these waters accordingly.

It therefore appears not only vain to make such a tedious addition to this treatise, as we find in many of the kind, but it might contribute to pernicious errors and abuses, by encouraging those to a rash mistaken practice, who have not just principles for deciding points of this nature; a reproach to which some medicinal writers, courtiers of the public applause, rather than friends to it's welfare, are too liable: for it is the truly learned in physic, and such alone, who, seeing the genius and properties of a medicine, can be capable of justly appropriating it by the indications.

General

General Rule I.

Before a course of these waters be entered upon for the cure of a disease, it is proper to give the patient, if come off a journey, some little interval of rest, and to let blood, if there be any inordinate motion, or a repletion in the vessels; for though a fluid so emollient be also gentle in it's action, yet such a preparatory evacuation is useful, to procure it room for circulating with ease, and for exercising it's salutary qualities.

I do not mean that some baths of the sort named *De Delices*, may not be taken without these precautions; on the contrary, being proper for refreshing and removing weariness, I would recommend three or four such lotions, to dispose the body the better for bleeding, in like manner as I would advise drinking the waters two or three days before a purge is administered.

There is no medicinal process wherein moderate bleeding more properly takes place, than in the use of these waters, if we consider their attenuating, dissolving, and rarefying effects on the inspissated juices, and consequently their contributing to fill the vessels; wherefore it may become more than once necessary in the space of a season.

II.

A vomit or purge is often indicated at beginning to use these waters; because the stomach and bowels of distempered persons are seldom without crudities, which embarrass the first passages, and would furnish morbid matter to the ways of circulation. And as the direct operation of this thermal fluid consists in scouring the capillary vessels, and dislodging their viscidities, a share of which thence naturally falls on the guts, it appears proper, regard being had to the constitution, to repeat gentle purging, that the impurities, too gross to be thrown off by other outlets, may be thereby discharged.

This may be thought to concern only the drinkers of these waters: but it also interests the bathers; for their humours likewise undergo great dissolutions, and are, by a general pressure from the circumference, repelled to the center; that is, to the stomach and intestines, where, if permitted to lie, they might produce mischievous consequences.

III.

To relieve the costiveness which these baths, like all diaphoretics, sometimes occasion, clysters of the same mineral water are the most ready and appropriated means.

And

And if a disease resides in any part of the lower belly, such balsamic injections serve at the same time as the best of fomentations ; which doubles the advantage, and becomes a motive for reiterating them frequently.

IV.

In external wounds, and ulcers proceeding from external causes, the hot *Douches*, only with some previous baths, answer all purposes : but if there be any marks of internal depravation, it is then material to drink the waters, either pure or with milk, in order to render the juices nutritious, healing, and apt for cure.

V.

From what precedes, we see the advantage and requisiteness of drinking them constantly, as often as the causes are internal.

VI.

When the *Douche* is necessary, care should be taken to place the patient in such a manner, that the waters may descend perpendicularly on the parts which require it : and if they be so delicate as not to bear a great percussión, it is very easy for an assistant to hold a tin pipe, as much smaller in diameter than that of the flowing source as may be thought proper, in

order to divide the volume of water, and by giving the pipe a due length, to diminish the height of it's fall.

VII.

The cavities of the body, that is, the head, breast, and belly, are not to be exposed to the *Douche* so freely as the extremities or limbs, and the reason is obvious.

VIII.

While a part is sore, or very tender, the application of the *Douche* should be very gentle; and suspended in the case of inflammation, using instead thereof fomentations of the water, with temperate baths, which soon procure the desired relief.

IX.

When the body is to be laid in the bathing-tub, to receive the hot *Douche* on several parts, as is sometimes necessary, care must be taken to open the vent in the bottom, that the water may constantly run off, instead of collecting, so as to communicate a permanent scalding heat, which would render the operation of *douching* much less convenient, or intercept it's impressions, by surrounding the body.

X.

X.

The proper conjuncture for dressing wounds is immediately after the *Douche*, and in the bath-room, the air and warmth of which are favourable thereto; and if any injections be required, the water is there at hand for that purpose, as well as to dip the necessary dressings; no other digestive, balsam, or salve, being generally needful.

XI.

The *Douche* may be used both mornings and evenings, if requisite, each of ten, twelve, or fifteen minutes duration: the hottest water is generally the properest for it, as well as for injections.

XII.

Tho' the *Douche* of these waters be so perfectly adapted to deterge and incarnate wounds; it is to be avoided, when the healing disposition commences, and dry lint to be employed; because not only it's mollifying virtue is contrary to the re-union of the last tender fibrils, but it's percussions would absolutely oppose the formation of a cicatrice.

For want of this rational reflection, persons at *Bareges* have sometimes been detained longer

at the very period of a cure, than by all the precedent operations : so nice an observance is due to every point in the art of healing.

XIII.

In cases where both baths and *Douches* are required, the former should precede, in order to dispose the parts to receive more efficaciously the influence of the latter : I mean temperate baths, which mollify and open the habit of the body ; for the hottest should be employed only in phlegmatic constitutions, and in distempers attending them ; such as palsies, or swellings which proceed from viscid cold humours ; and even in these the *Douche* is still preferable, on account of the manner of applying it ; because it's successive percussions render it not only more discutient and advantageous, but less tiresome and difficult to continue, than soaking the whole body, and leaving it to endure the permanent heat of so warm a fluid.

By ignorance and injudicious practice in these respects, some have been thrown into great disorders ; against which I have found the temperate baths, and internal use of the water mixed with milk, to prove a ready antidote.

But I say the hot *Douche*, administered with the * precautions before mentioned, is not capable of producing any other than good consequences ; it imparts a beneficial glow to the

* Vide Rule 6, 7, 8, 9.

whole habit of the body, after which the patient finds himself fresh, vigorous, and sprightly.

XIV.

To cure indurated tumours, the temperate bath, being the essential agent for mollifying, is to be used as much as possible; and when the *Douche* becomes seasonable, due care is to be taken to regulate it's volume, it's fall, and it's repetitions, in such degrees, as not to irritate or inflame the surrounding parts; for a misconduct therein might be productive of the worst of consequences.

XV.

The bituminous grease of the waters well rubbed, after bathing or *douching*, on stiff, contracted, or hardened parts, contributes greatly to a cure.

XVI.

When a disorder is rebellious, and the parts afflicted are susceptible of particular immersions in the mineral fluid, as the extremities of the body, with many places of the head and face, it is important, besides the usual application of the waters, to find convenient methods of administering local baths, which may be at all times taken in the patient's room; for by

steeping the part often in a day, the advantages are multiplied in proportion.

XVII.

In rheumatisms, and other diseases, derived from imperfect perspiration, if they be of a long standing, accompanied with aridity and hardness of the skin, a course of the temperate baths should necessarily precede, for reasons sufficiently set forth ; but if the disorder be recent, it may be directly attacked, after very few temperate baths, by the hot *Douche*, which is capable of dissipating the cause immediately.

XVIII.

For obstructions of the *Viscera*, besides drinking, and the temperate baths, gentle *Douches*, applied in due time and measure on the parts affected, may be highly useful, as aids to a dissolution or excretion : for example, for the gravel, and impeded *Menstrua*, on the loins ; and in other cases, according to the situation of the evil, as far as the nature of places may permit ; but during the menstrual course every thing is to be suspended.

XIX.

In distempered constitutions and internal diseases, the essential point evidently consists
in

in drinking the waters, either pure or with milk ; yet the temperate baths are sometimes to be admitted as salutary associates.

XX.

Neither baths nor *Douches* are to be taken till four, five, or six hours after meals ; because the rarefaction caused thereby in the humours, would incumber and offend the stomach, while it contains aliments, and is employed in the work of digestion.

XXI.

The ordinary duration of the temperate bath is one hour, but it may with safety be extended to any space desired, and is frequently better if continued for two hours or more.

XXII.

After baths, as well as *Douches*, it is best to lay the patient in a warm bed for the benefit of perspiration, on which the success of these waters so greatly depends ; or to promote a sweat, if judged proper, which is readily obtained by adding bed-cloaths, and observing to keep the head as much as possible under their cover.

During

During this evacuation, no drink is fitter than the bath-water, gently to promote it's flow, and to recruit the spirits.

XXIII.

The internal use of the temperate source is, in general, most appropriated to distempers of the breast; and portions of milk are very successfully drank therewith, unless there be some counter indication.

But here let what I have already † said be remarked, *viz.* that stomachs, never before capable of bearing milk, can in a morning digest a bottle thereof, or more, mixed with this liquid.

XXIV.

Bathing is dangerous in disorders of the lungs, because thereby an increase of humours is thrown upon a part weakened by disease, naturally lax, and of little resistance.

XXV.

If the temperate spring be deemed not active enough, for some temperaments, and the hot too much so, it is easy, by mixing them, to form any intermediate degree.

† Vide Part III.

XXVI.

The proper time for drinking these mineral waters, as all others, is the morning.

The quantity is to be regulated according to the patient's state and malady; but, in general, it is most advisable to take moderate portions thereof, as a bottle, or three pints, and for a due continuance; that being the way to render them truly alterative.

A glass taken three or four hours after dinner, helps to perfect digestion.

XXVII.

A quarter of an hour should be left between each draught; that the stomach may not run the risk of being cloyed, or suffer any other inconvenience.

XXVIII.

If the weather be tolerably good, it is important to drink these waters at their sources, in order not to lose a particle of their volatile balsam; but if it be very foggy, or cold, it is more prudent to put up with the dissipation of some of this precious spirit, by sending for them home, than to venture the least check to perspiration.

XXIX.

The diet at *Bareges* should be moderate, light, and refreshing: good soup, mutton, veal, chicken, partridge, roast or boiled, offer a sufficient variety for valetudinarians, with the excellent milk and cream, which I have already recommended: but those who live on this balsamic food should not taste wine.

XXX.

The kind of ordinary drink depends on the state, habit, and circumstances of patients: those who are in the case of drinking water only, may use that of the cold fountain, taking care to have it boiled, in order to take off the crudity natural to all common waters, in mountainous countries where there is perpetual snow: or if they choose that of any of the mineral sources, should the taste and warmth thereof be found disgusting, it will soon lose both if left to cool; and though few or none of the bituminous principles remain, it will still continue light and salutary.

Those whom wine suits, may mix white or red with either of these liquids, for their drink at meals.



A P P E N D I X.

AS the remoteness of *Bareges* from *England*, with the first view of such a journey, might discourage some persons, and occasion their neglect of the only means of being relieved, or cured, in some diseases; I think it proper to represent, that most of what they can apprehend, both in expence and fatigue, may be avoided, in going by sea from *Portsmouth*, or any other port in the *Channel*, to *Bordeaux*, which is a safe and easy passage, frequently of a few days only; especially in the month of *May*, the season to set out for these waters.

From thence it is reckoned there are about thirty-six leagues of good road, without mountain, or other difficulty, now that the coachway by *Lourde* and *Luz* is finished.

Those who chuse travelling by land, may debark at *Calais*, *Boulogne*, or *Dieppe*, and proceed by *Paris*, *Lyons*, *Pont St. Esprit*, *Montpelier*, *Beziers*, and *Toulouse*.

Though

Though this route be longer than that by *Limoges*, or the other by *Poitiers*, it is greatly preferable, because of the excellent roads and accommodations : Besides, the traveller has the advantage of seeing many of the finest cities, with the agreeablest countries, and mostly what is curious in *France*; the delightful improvements which commence at *Chantilly* attending him on all sides, with a sumptuous variety, to the august city of *Paris*, and thence to *Fontainebleau*. Afterwards, if he proceeds by the *Mou-lins*-road, he finds the winding river *Loire*; or, in taking the more eligible one of *Burgundy*, the pleasing banks of the placid *Soane*; next, the celebrated city of *Lyons*, so remarkable by it's beautiful situation; the rapid *Rhosne*, bounded by hills, adorned with diversified landskips, and enriched with vineyards, productive of the most valuable wines, *Cote-rotie*, *Hermitage*, and others.

Then occurs the famous *Pont St. Esprit*, the curious *Pont de Gard*, the new embellishments at *Nismes*, its prodigious amphitheatre, with other signal monuments of the *Roman* grandeur.

No less interesting is that admirable work, the Canal of *Languedoc*, of infinite utility, whose waters, notwithstanding numerous obstacles, are made to glide through thirty leagues of unlevel country, from *Beziers* to *Thoulouse*, carrying the navigator, by the efforts of art, over hills, across vallies, thus perfecting the
long-

long-wished for communication between the *Mediterranean* and the *Ocean*.

Moreover, there is this real advantage in taking the *Lyons* and *Languedoc* roads, that the traveller, if weary of land-carriage, may take boat from *Chalons* to *Lyons*; from thence to *Pont St. Esprit*, or *Avignon*; and again from *Beziers* to *Thoulouse*; which passages, by water, forming no small part of the journey, lessen his expence, afford him intervals of rest, and prove an agreeable variety. Besides he goes down the *Rhosne* with greater expedition than he could by post.

From *Thoulouse* to *Bareges* there are about twenty-four leagues good road, through a fine country.



A N
E N Q U I R Y
I N T O T H E
C A U S E of H E A T
I N
B I T U M I N O U S W A T E R S,
A N D O F
T h e i r S p e c i f i c V A R I A T I O N S.





A N

E N Q U I R Y

I N T O T H E

Cause of Heat in Bituminous Waters,

A N D

Of their Specific V A R I A T I O N S.

THE disquisitions which I propose, regard not only the satisfaction of curiosity, but are more particularly intended for opening new lights into the nature of bituminous springs, conducive to their medicinal appropriations; it being the useful purport of physics to render things that are obvious to our senses, obvious to reason also.

Philosophers have greatly puzzled themselves and others by imagining many groundless or insufficient causes of their heat, while there is but one that appears so susceptible of clearness as to need no more than to be rescued by investigation and reasoning, as I shall endeavour to do, from some obscurities, doubts,

and objections, to which it has remained subject ; the only one that is capable of fairly accounting for this phænomenon, and which being rightly displayed, I humbly presume, will suffice to explain whatever relates to these interesting fluids ; and will, at the same time, furnish some satisfactory ideas, hitherto not published, concerning the modifications of the mineral which impregnates them.

Though formal demonstrations cannot attend all the points of my subject, yet, seeing they are all supported by principles founded in evidence, and physically deduced from them, so as to content the understanding, they surely acquire a high degree of conviction : and this, I think, well worth our pains ; it being more than *Wallerius*, or others have done, who barely advance hypothetical systems, without any illustration, or removing the attending difficulties.

The several classes of bituminous waters are reducible to three, whereof I give these of *Bareges*, those of *Aix-la-Chapelle*, and those of * *Borçet*, as general examples, to which the rest may be referred.

The first are petroleaginous ; the second purely sulphureous ; and the third ferrugineo-sulphureous.

Without attributing any original difference to their impregnating principles, all deriveable

* Hot waters near *Aix-la-Chapelle*,

from the same source, these variations become evident to sense, through the intervention of subterraneous fires, acting in divers degrees on bituminous matter, dividing it's parts, and producing specific * alterations therein, similar to those we see in the subsequent process, which serves to illustrate, and to establish, by comparative proofs, the system here proposed.

Mix equal portions of spirit of vitriol, and oil of † turpentine; let them stand for some days to incorporate, then distill them in a retort.

What first rises is a liquor nearly imitating *Petroleum*, in colour, as well as oily consistence; and there remains a thick, bituminous substance, which, in time, becomes a hard, black mass, inflammable, and of an odour like that of coals fresh dug; both, probably, being of a like origin and nature.

But by continuing the distillation, and augmenting the fire, there next appears a white, acid liquor, whose sediment is real sulphur; and in the neck of the retort remains a yellow inflammable substance, every way answerable to common flowers of sulphur.

What is afterwards found, at the bottom of the vessel, is a calcined mass, which contains

* An instance of such mutation appears in the red vitriol, found in *Germany*, and allowed to be the effect of subterraneous calcination.

† Oil of amber answers the same purpose.

some alkaline salt; therefore is no *Caput Mortuum*.

In viewing such results from a bituminous compound, by means of fire, we already perceive, not only a dawn, but even strong light reflected on the objects of our enquiry; for, by numerous circumstances, we are surely led to think that this universal † agent, no less effectual when moving in it's subterraneous dominion, exerts it's powers there on bituminous minerals, and, according to it's force, exalts the petroleaginous, or the sulphureous particles, which, with their steams and vapours, as waters circulate every where through the globe, are quenched in those they meet, imparting thereto their degrees of heat and virtue.

Who can well doubt of this, who observes the streams of *Petroleum*, which abound in *Podolia*, in some parts of *Russia*, as well as in the country about *Naples*? or sees at *Solfatara*, as well as round the *Crater* of mount *Vesuvius*, the pure sublimed sulphur, which, together with aqueous exhalations and hissing air, rises

† Sunt autem cunctis permitti partibus Ignes,
Qui gravidas habitant fabricantes Fulmina Nubes,
Et penetrant Terras, *Ætnæque* minantur *Olympo*.

Manil. Astronomia.

incessantly from numberless crevices, forming cakes, of which I gathered many.

Sure there is nothing plainer, than that different actions of fire may be excited, and subsist in the bowels of the earth, by the various influence of the air, admitted in greater or smaller quantities, and more or less at liberty to play, according to the porosity and hollowness of spaces; so that in one bituminous mine, as hath been said, it will suffice to raise the petroleaginous, in another the sulphureous parts, and in a third, by strongly propelling both, it will evaporate and dissipate them, leaving intense heat, and calcined saline remains, such as we see at *Borcet*, to the fluid they pervade, entirely conformable to the process in the preceding distillation.

Here is no room to object, that the volatile principles being, according to this system, given to the two first waters, cited in our examples, only a *caput mortuum*, incapable of sublimation, is left to the third: this objection is of no weight; for, to explain myself fully, I repeat it, as consonant to all physical reason, that bitumen burning in sundry places, as most certainly it does, should undergo various modifications, dependent on the circumstances above mentioned; and that where it affords *petroleum*, water occurring, the result necessarily is a mineral fountain, or fountains, like those of *Bareges*, accidental changes excepted; that

where the sulphur is raised, it produces such as those of *Aix la Chapelle*; and when by the igneous power the two are driven through an aqueous body, it is rendered of the nature of that at *Borcet*.

Nor does it appear carrying the point too far to conclude, that those operations may, according to the foregoing ideas, subsist with a perpetual regularity: nature's laboratory is to be confided in more than that of art.

We observe her mechanism very plainly in many of her most admirable works: and as she must use some process in the exquisite preparation of thermal fluids, where all the properties of their principles appear unfettered, why not that of distillation, which is most adequate to their perfection.

However, such are the notions, let who will correct, improve, or cavil at them, which I humbly offer, concerning the different modifications of bituminous matter; the efficient causes of mineral hot waters, and of their specific variations.

A due account is withal to be made of the salts, which naturally intervene, and which, by combining together, compose those known by the appellation of *Neutral*. Their action may be justly considered as of use to break and divide the tenacious oily particles, to blend them intimately with their aqueous vehicle, and to maintain, in the whole, that order of motion, so
remark-

remarkable by it's * correspondence with the circulation of animal fluids.

If we extend our reflections, to the several classes of bituminous water, and compare their various principles, as well as degrees of heat, with the different products of spirit of vitriol and oil of turpentine distilled together; as also the gradations of fire required for them, we may observe very interesting and satisfactory parities.

Bareges-waters, of the class moderate in warmth, are endued with a *petroleum*, analogous to that bituminous liquid which is raised by the first degree of fire in the said distillation.

Those of *Aix la Chapelle*, being hotter, abound in pure sulphur, which is found sticking to the roofs of their conduits, just as the flowers of sulphur sublimed by the second degree of heat, adhered to the neck of the retort.

And † *Borcet* fountains, the hottest of all, exhibit plain marks of a similar conformity: for the sediment, a calcined-like powder, imitating coal-ashes, bears a resemblance to what remained in the bottom of the retort, when the process was finished.

A further similitude between the results of our distillation, and these several mineral

* Vide Chap. V. of the treatise on *Bareges*-Waters.

† Vide *Blondel* de thermis Aquisgranis et Borcetan.
Page 52.

sources, is remarkable in their respective properties.

These of *Bareges* are unctuous and mollifying, like a petroleaginous oil; those of *Aix la Chapelle* are aperitive like sulphur; and those of *Borcet* possess astringent, tonic virtues, as calcined and alkaline substances do.

By all the preceding observations and reflections we must surely be induced to think that fire, operating in the bowels of the earth, by a subterraneous chymistry, produces different modifications of bitumens, just as we see is effected by a culinary fire, and proves the origin of thermal waters, with all their specific variations.

These principles acquire still further evidence as we advance; seeing we are thereby enabled to account, rationally, for all that has appeared intricate or paradoxical concerning these fluids.

It is already obvious, how they may receive their impregnations from contiguous burning mines of bitumen; and likewise very probable that its different sublimations may produce their different classes, with a permanent regularity since, as has been said, † experiment evinces; that the igneous impulse, which is capable of exalting the petroleaginous, cannot move the more weighty parts, charged with salts which

† Vide Page 197.

compose sulphurs; whence it follows that a force sufficient to volatilize the latter, must dissipate the former, when unconfined: and, of course, a further encrease of fire must expell, and scatter both, so as to leave only the calcined alkaline remains, according to the comparative examples in our * distillation.

An objection may be drawn from hence, viz. that hot fountains of each class should then be every where, and constantly the same. To which it is answered, that they are so, in regard of what constitutes their essential nature and appellation: for adventitious changes argue nothing to the contrary; variations, for example, in degrees of heat form no difficulty; it is enough that the specific principles appear; the cool springs at *Bareges* are not, on the account of their being so, less of the petroleaginous kind: they must only be considered as weaker; and primitively, at the focus, their warmth was doubtless equal to that of the others; which decides enough.

But, to render every thing relative to our subject more satisfactory, and to obviate cavils, as far as possible, I will here endeavour to account for the fundry alterations incidental to mineral hot waters: and likewise, to remove the most specious objections against this system, and to explain points which have been deemed

* Vide Page 197.

paradoxical, in order thereby to give it a further clearness.

Some waters forming separate springs, though plainly derived from the same source, possess diverse degrees of heat, as well as of virtues: witness the several baths at * *Bareges*.

Such irregularities are plainly owing to cold streams, which meet and mingle with those veins, whose qualities are accordingly weakened or diminished.

Others also, flowing in various branches, are all below the known standard of their class, which is fairly to be ascribed to cold waters falling into the main channel, or their having run so long a course from the place of their impregnation to the spot of their vent, that part of their virtues is lost by the way; and it is doubtless by being exempt from these disadvantages that the fountain at *Bareges*, named † *le Grand-Bain*, proves so rich in petroleaginous principles.

Many, though warm, are almost insipid, as those of *Chaude Fontaine*, near *Liege*; the *Aquæ Gestanæ* mentioned by *Strabo* ‡; several at *Egesta* in *Sicily*; at *Troas*, *Larissa*, *Melos*, and *Lipara*, spoken of by *Pliny* §, with others taken notice of by *Fallopious*; all naturally rendered so by their gliding through long tracts

* Vide Treatise on *Bareges*-waters, Chap. I. Part I.

† Vide Ibid.

‡ Lib. II. Geograph.

§ Lib. XXXI. Hist. Nat.

of particularly absorbent earths, and such as are capable of intercepting their mineral principles.

There are thermal fluids which lose their bituminous, and retain only their saline parts; as the *Aquæ Valderianæ* in *Italy*, and those of *Bourbon* in *France*; because, as *M. Duclos* remarks, their oil, by an aptitude thereto, flies off, and their salts alone remain.

It is likewise easy to account for some containing different mixtures; as of steel, those of *Bath* in *England*; of alum, the *Carolinæ* in *Bohemia*; of vitriol, those of *Viterbo* in the *Campania* of *Rome*; or of such other minerals as they happen to meet; for, by the powers of their heat, and their penetrating salts, they easily detach and carry along with them corpuscles thereof, according to the quantities they can bear, or to the facility of entering their ores, which naturally depends on their growth, maturity, and compactness.

Further explications relative to bituminous waters, occur properly in solving the objections raised against the cause here assigned for their heat.

Those who attribute this *phænomenon* to other agents, as motion, collision of different bodies, innate heat of the earth, influence of the sun, an universal spirit, or others equally precarious and unwarrantable, oppose the following difficulties; one of which, were it founded

founded, would suffice to overturn all I have said.

1. They deny the possibility of subterraneous fires that have no discernible vent; because they cannot act without air.

It is justly allowed they cannot, but instead of an objection this is a very wrong supposition; for considering the subtlety of the air, and the penetrability of the earth, we cannot imagine any of it's recesses, especially wide hollow spaces, naturally the seats of burning bitumens, void thereof, nor can we doubt of it's finding every where breathing holes, since it pervades the winding mazes and the minutest pores of the compactest bodies.

Moreover, as all the hot waters that we can have any knowledge of, have outlets, nothing surely hinders the much finer air's free ingress and egress thereby, so as to enjoy a ready communication with our atmosphere.

Nay, how pervious the earth is, is manifest from certain fountains, which, though very distant from the sea, ebb and flow regularly therewith, and even receive the plenitude of spring tides.

There are several of this kind, and particularly one in *Westphalia*, near the village of *Altenbacken*, about two hundred leagues from the *Baltick* sea, which every day overflows the neighbouring fields at stated hours, and recedes accordingly.

2. It

2. It is added, that, supposing there were any such fires, the waters would certainly extinguish them.

This assertion is against known facts; for bitumen burns readily amidst waters, as appears from several tracts of sea where it is seen flaming, which is the case also of some fountains, particularly one in *Dauphiné*, mentioned by † *Duclos*, with others cited by the most credible writers.

Such examples are surely conclusive; nor does sulphur's yielding it's combustible faculty to that liquid element, argue any thing against them; since our process || with oil of turpentine and spirit of vitriol proves sulphur to be not a bitumen, but a modification derived from it.

But granting this objection all it's seeming force, it would carry little or no weight with it; for what could be the effect of the quenching powers of some aqueous streams, passing amidst mountains of bitumen, incessantly burning, and which probably have fire diffused throughout their vast regions.

3. It is alledged, that such fires burning for ages, would long ago have exhausted the

† Vide Observations sur les eaux minerales de plusieurs provinces de *France*, p. 195.

|| Vide p. 197.

greatest stock of combustible matter supposed laid in for their subsistence.

I answer, that the great consumption here imagined is to be deemed very inconsiderable in regard of the stores which provident nature affords; for surely we may here think with *Lucretius*,

*Semina rerum
Ex infinito satis omnia suppeditari.*

Moreover, this difficulty will entirely vanish, if we turn our eyes to Mount *Ætna*, *Vesuvius*, and other *volcanos*, whose flames date from very remote times, without any appearance of ending; though, being quite open to air, they must act more impetuously, and waste faster than in close places.

4. It is urged, that if subterraneous fires existed in those recesses whence hot waters proceed, they would at length have made their way out and shewn themselves by eruptions.

And such we own hath been the case in many places; as a view of *Ischia*, *Pozzuoli*, and others about *Naples* plainly demonstrate: nor should we doubt of it's proving the same in all, were the *focus* or fuel near the surface, as it probably lay in these mentioned, as well as in *Mount Hecla*, *Chimæra*, and others needless to enumerate.

But it is reasonable to conclude, that in those mountains whence hot waters issue, yet
no

no fires are visible, the bitumen lies numberless fathoms deep under resisting masses of clay and rock, by which the flames, heat, and vapours are reverberated, concentrated, and condensed; nor can it be denied that marks are sometimes perceived, which denote the burning contents.

5. Further it is argued, that if sulphur were concerned in heating waters, then all impregnated therewith would be warm; whereas there are contrary examples, as the *Geronster*-fountain near *Spa*, which, though sulphureous, is extremely cold.

To explain and answer this, it sufficeth to consider, that sulphur, though not inflamed, imparts * itself to waters, and contributes to their quality of coldness: as it is not then necessarily nor always on fire, nothing more natural than that being out of that state, and communicating with aqueous fluids, it should produce sulphureous cold springs like the *Geronster*.

6. M. *Blondel*, author of a treatise on *Aix-la-Chappelle*-waters, remarks, that some in *Italy* and other countries, amidst which bitumen is seen to flame, possess no great heat nor mineral quality, and that those of the hottest class, as at *Borcet*, afford neither bitumen nor

* Quæ exacté & sinceré aqua est, si per bituminosa, sulphureosa, decurrens substantiæ aliquid absterferit, secumque detraxerit, &c.

Vide. Gal. 2. de simpl. med. facult.

fulphur; therefore he concludes that these combustibles have little or no share in the heat of waters.

First it is replied, that where bitumen burns in open view, it should, on that very account, leave but little of it's influence, because it is exhaled, spent, and lost in air.

Secondly, as to the fact that no bitumen nor sulphur is found in some waters of the hottest class, though it be seemingly a fair contradiction to my principles, yet it is easily explained, and the cause to be clearly perceived in looking back to our distillation of spirit of vitriol with oil of turpentine, which shews by exemplary effects how subterraneous fires can decompose, modify, and sublimate bituminous substances, till nothing remains but a calcined alkalious matter, like the sediment † of *Borcet* fountains.

Whence it plainly follows, that the hottest waters, for the very reason of their being so, are void of petroleaginous and sulphureous particles; both having been exalted, scattered, and dissipated by the force of fire, and the ebullition thereby occasioned.

And here it is perhaps just to say, that this last difficulty admits of no satisfactory solution, according to any other system than that here laid down, which is an argument in it's favour.

† Vide p. 201.

M. *Blondel*, moved by so plausible an objection, seeks another cause for the heat of mineral waters, and thinks he has found it in the effervescence of acids with alkalies : which, by exciting degrees of commotion and heat proportionable to their quantities, constitutes, in his opinion, the variety of hot fountains.

This idea, though specious in chemistry, by such instances as the ebullition of spirit of vitriol with oil of tartar, is very insufficient for explaining the several *phænomena* attending *thermal* fluids ; and is, moreover, liable to the strongest refutations.

1. Because no account is made of the bitumen, which always interfering in some manner or other, communicates heat as often as the fire with which it is replete, escapes from it's cells or prisons, and is therefore more naturally to be deemed the efficient cause of hot waters, than an effervescence of salts, in every respect precarious.

2. I say no foundation can be laid for this *hypothesis* of M. *Blondel*, without having recourse to subterraneous fires ; for alkaline salts, being creatures of the fire, cannot be imagined to exist in the bowels of the earth without it's previous action ; and thus to suppose his own, he is obliged to admit our opinion.

3. If the heat of mineral fountains proceeded from an effervescence caused by salts, the degree would be in proportion to their quantities ; and it would follow that every

hotter water should most abound therewith: but the contrary is manifest; for that of *Bor-cet*, notwithstanding it's exceeding great degree of heat, contains, as *Blondel* * owns, no more than that of *Aix-la-Chappelle*, adding, that it is more terrestrious, impure, and alkaline, proofs of the igneous operation; and the fountain named *Le Grand Bain* at *Bareges* is certainly hotter than any at *Balleruc*, yet in the former there is scarce any salt to be tasted, and very little to be found; while the latter is very copiously impregnated, as their taste on the palate, and their purgative efficacy sufficiently demonstrate.

4. It may justly be objected, that a supply of the requisite acids and alkalies, so constant and equal as to maintain the even degrees of heat perceived in bituminous waters, is out of all probability: for such a perpetual effervescence being of more complex circumstances, consequently it's operations are more liable to disorder than those of subterraneous fires, and at the same time bear no comparison in respect of their being adequate to the effects in question.

Seeing therefore Bitumens sublimed in the manner here set forth ||, can alone answer satisfactorily the objects of our enquiry, let us, moreover, consult the observations and authorities of accurate writers relative thereto.

* Vide *Blondel* de therm. *Borcetam*, p. 52.

|| Vide p. 197.

Agricola † calls bitumen the food of subterraneous fires; says it most readily takes flame, and is hardly extinguishable; he adds, that there are some sorts of it which burn more fiercely amidst waters than elsewhere; and *Pliny* ‡ assures the same; *Agricola* farther mentions bitumen burning under water.

Gabri Rzaizinski *, in his Natural History of *Poland*, writes of a fountain in the palatinate of *Cracovia*, which burns continually.

Aristotle ¶ talks of subterraneous fires; so does *Seneca*, who says what is directly to our purpose, that the earth in many places covers fires which impart heat to waters.

Baccius || cites positive examples of bitumen burning subterraneously, it's producing mineral hot waters in the *Campus Vulcani*, between *Pozzuoli* and *Naples*; and truly the inspection of *Ischia*, not far distant, will be convincing enough to any beholder, as it was to me in this matter.

Let us attend to what the learned Father *Kircher* |||| relates of occult subterraneous fires, and we shall be persuaded, as he was, of their existence.

† Vide lib. 1. de ortu & caus. subterranean.

‡ Lib. 2. hist. natur. p. 221. edit. *Harduin*.

* Vide p. 119.

¶ Vide lib. de Mundo.

|| Vide lib. 1. de Therm. cap. 18.

|||| Vide Mund. subterranean. sect. 1. lib. 4.

Having quoted *Plato*, *Pliny*, *Vitruvius*, *Cicero*, with other respectable authors on his side, he refutes the objections raised against his assertions.

He says, that subterraneous fire is a portion of the elementary residing in a bituminous fuel within caverns and recesses of the earth; that it is indispensibly necessary for the generation, life, and growth of all it's productions; he further observes, that fire and water are requisite correctives there, with respect to each other; as the former, without the latter, would consume the globe; and this, were it not animated by the other, would ever remain congealed and unfit for vegetation.

After much reasoning, he proceeds to historical arguments; appeals to *Italy*, *Germany*, *Tartary*, *Japan*, *Africa*, even *Greenland*, for examples of such subterraneous fires, and gives himself a witness of indubitable proofs concerning many.

His description of the *Ager Puteolanus* in *Sicily*, shews clearly how waters receive their warmth, together with their impregnations, from bitumen, which he terms a resinous, pitch-like matter.

Moreover, those dreadful disasters, earthquakes, so frequent in our days, serve to confer a great degree of illustration on this subject; for they proceed from the violent agitations, and intestine efforts of rarified air, within hollow spaces, which concealed fires have formed;

formed ; and this is so true, that igneous eruptions often attend such convulsive struggles ; witness the great unhappy *Lisbon*, not more wrecked thereby, than destroyed by flames issuing from its foundations.

A full confirmation of what I have said is, that the ground sometimes subsiding, towns, mountains, and tracts of country, are precipitately buried in the horrid ruins, a new scene, generally of water, occupying the place. Of this we had a famous instance in the year 1638, when *St. Euphemia* in *Calabria* being suddenly swallowed up, a lake appeared in its stead : and there are two like terrible examples, one of *Lima*, and the other of a place in the kingdom of *Morocco*, in 1755, when our globe seemed, as it were, attacked by pangs through all its regions.

The thunder *, which is heard to roar under ground, is likewise a proof of the operation of subterraneous fire ; such often struck *Father Kircher* with dread, during the great earthquakes of *Calabria* ; and so vast are the spaces free for its explosions, that once he judged it to have taken it's rise from a mountain sixty miles distant from the spot where he stood, and perceived it's gradual approach ; whence he thinks there are communications between *Calabria*, *Ætna*, *Strombulo*, and other volcanos neighbouring on *Sicily*.

* *Kircher Mund. Subterranean. pag. 221.*

After all that is said, with arguments to the same purport, which may be drawn from subterraneous winds†, sure no doubt can remain of there being sufficient room for elastic particles of air to play, and hidden fires to subsist within the bowels of the earth.

I will add only one reflection more, that where-ever bituminous matter is found, with traces of subterraneous fire, there numerous hot sources generally appear; as about *Solfatara*, *Baja*, *Ischia*, *Misenum*, *Cuma*, and the adjacent places, ever memorable for having been the favourite abodes of the most illustrious *Romans*, and themes of their immortal poets, but now remarkable for ruins which time and natural catastrophes have brought upon them.

By the foregoing ideas, which I submit to the ingenious reader, I wish to have thrown some new light on subterraneous fires, as the causes of heat in mineral fountains, as well as on the process, by which nature may be thought to produce their specific variations; at least they may serve as hints to others, who engage in these physical investigations.

† Vide *Kircher Mund. Subterranean*. pag. 220.

A Letter from the Rev. Dr. *Stephen Hales*,
to *William Morehead*, Esq;

S I R,

Teddington, May 11, 1742.

I Have read Dr. *Meighan's* treatise of the nature and powers of *Bareges-water* with great pleasure; it's salutary effects are very powerful and great, and the *rationale* he gives of the manner how such waters are impregnated by sulphureous and bituminous mixtures in the earth, is very ingenious, and confirmed by the like effects, observable in the several degrees of distillation of equal quantities of spirit of vitriol and turpentine oil. And tho', as he observes, we can never come up to the perfection of nature's preparations, yet I think we have a good hint, from that experiment, to attempt an humble imitation of nature, which might probably be of great use in many disorders incident to human bodies: it is this, *viz.* That whereas the most subtile æthereal oil, and volatile salts, arise in the first part of the distillation, I would propose to immerse the neck of the distilling retort in very hot water, or into the bung-hole of a hog's-head, or other vessel of hot water, which vessel, (if the retort have a pliant neck added to it) being frequently agitated to and fro, or stirred with a stick or paddle through another bung-hole, well closed about the stick to keep in the fumes, the water would thereby

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be impregnated with the subtile sulphureous vapours, as cyder and wine are in the same manner impregnated with the fumes of burning brimstone; by which means the water might be impregnated with these æthereal fumes to such a degree, as shall be found requisite, and the water being hot, they will continue in their subtile attenuated state to which their de-obstruent efficacy is principally owing. Thus Dr. *Meighan*, in his 5th experiment, found no alteration in the quality of *Bareges*-water, when he put a quantity of it into an earthen pot, which was placed in another vessel frequently replenished with hot bath water, for twenty-four hours continuance, whereas if some of the same water remains only half a minute in a glass to cool, it almost loses it's sweetishness, becoming in a manner flatly disagreeable, and harsh to the taste: not as has been commonly supposed in the like case, *viz.* because the fine subtile spirit was, in that short time, all evaporated away; for we see in the Doctor's 5th experiment, that it did not fly away in twenty-four hours, tho' continued in a very hot state all that time; whence it is evident that the vapidness, and great alteration of the waters in standing but half a minute, must be owing to the degree of it's cooling, whereby it's subtile æthereal oil and salts were formed into groffer combinations, and were thereby become effete and unmedicinal; which I have in my treatise on steel waters,

waters, by variety of experiments, shewn to be the case in bath, and other steel-waters.

And therefore I very much suspect that the moisture, which the Doctor observed on the outside of his broken bottle, did not transude through the substance of the glass, but was owing to the dampness of the case it was in.

In order to be assured whether the subtile spirit of these waters transudes through the substance of glass, as some have suspected of other mineral waters, let a glass bottle be filled brimfull of the *Bareges*-water, and then covering the nose with the hand, invert it into a pot of the same water wiping the upper part of the bottle very dry, to observe whether any subtile vapour transudes through the substance of the glass; which it assuredly cannot do; yet when the water in this inverted bottle is cold, it will be found as vapid and harsh as some of the same water, which cooled in an open vessel: hence this vapidness is not owing to the flying off of it's subtile spirit, but to grosser combinations of it, occasioned by cold.

Whereas the Doctor mentions a remarkable circumstance of these waters, *viz.* that cold water being set on the same fire, at the same time, with the hot bath water, the cold water boiled a minute before the hot; it were to be wished that this experiment were repeated again, by putting the two vessels of bath and cold water, at the same time, into a large vessel of boiling water. It were to be wished that Lord *Crawford*, or any one that is going to *Bareges*, would
 carry

carry a mercurial thermometer, graduated according to *Fahrenheit*, that would bear a scalding heat; we should then know the exact degrees of heat of those waters, which do not offend in drinking, as equally hot common water will do.

This would also be of service to regulate thereby the heat of the abovementioned artificial baths, if on trial, they shall be found to be beneficial, which I am persuaded they will prove, both for bathing and drinking.

I am,

S I R,

Your most humble servant,

Steph. Hales.

Monsieur

Lettre de Monf. *Hunauld*, à Mr. *Meighan*.

A Paris, ce 3^{me} May, 1742.

MONSIEUR,

J E vous suis bien obligé des marques que vous me donnés de votre souvenir ; je fais trop de cas de votre amitié, pour n'être pas fort aisé d'en recevoir des preuves. Je vois aussi, avec toute la satisfaction possible que votre ardeur pour la medecine se soutient toujours, & même qu'elle augmente. * * * *

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Puis que vous estes à portée de continuer l'examen que vous avés déjà fait sur l'efficacité des Eaux de *Bareges*, je vous exhorte, & je vous prie, de le continuer : ces connoissances sont trop interessantes pour la medecine pour être negligées, & vous estes parfaitement propre à les acquerir. Une observation exacte, & souvent repetée de leurs effets, est le moyen d'y parvenir.

J'ai receu, avec un tres grand plaisir, le Traité que vous avés composé, & j'y ai trouvé assés de choses propres à me bien instruire sur ces Eaux admirables, qui, par le peu qu'on en sçait dans ce pais, m'étoient presque entierement inconnues.

Donnés

Donnés moi, je vous prie, de vos nouvelles ;
 soies persuadé que je m'y interesse, & que je
 ferois charmé de trouver des occasions de vous
 donner des preuves de toute l'estime & de
 toute l'amitié avec lesquelles j'ai l'honneur
 d'être,

Monfieur,

Votre très-humble & très

obeissant Serviteur,

HUNAULD.

F I N I S.

